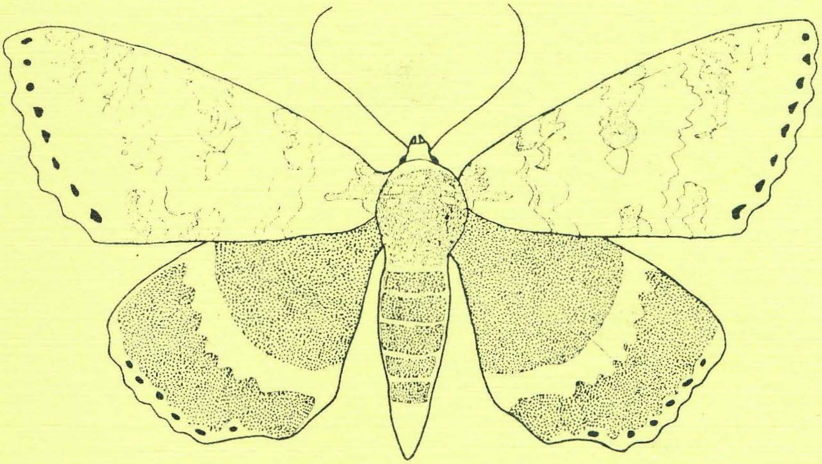
Vol 3, No 1 Winter 1986

Y.E.S. QUARTERLY

YOUNG ENTOMOLOGISTS' SOCIETY



Catocala relicta clara

Illustration by: Sue Andres-Seabolt
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YOUNG ENTOMOLOGISTS' SOCIETY

Y.E.S. QUARTERLY

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INFORMATION FOR AUTHORS

Manuscripts and original artwork on any insect or Arthropod-related topic are welcome for publication in Y.E.S. QUARTERLY. Articles with special interest to young entomologists will receive publication priority. Manuscripts may be of any length, but should be double-spaced and typed (or neatly written). Photographs or maps should be done in black and white, and any drawings, charts, or graphs or maps should be done in black ink and should fit in the new page size. All authors should supply a title for their article and a complete mailing address. We're sorry, but no page proofs can be furnished.

Other features, including news, field notes, book reviews or other illustrations, are also accepted and will be used when space is available. Members may submit short "advertisements" for the "Trading Post" section, describing their special desires for information, correspondence or specimens. All ads will be edited for brevity and acceptability and their inclusion will be made on a space-available basis.

Send to: Young Entomologists' Society, c/o Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 USA.

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SOCIETY NEWS & BUSINESS

Hopefully it is not too late for me to wish you a healthy, happy and prosperous New Year! Last year was certainly a good one for Y.E.S., and I am really looking forward to 1986. We have some really great activities planned, so get ready.

Speaking of 1986, you should have already received your copy of the 1985/86 Member Directory, membership renewal request and a request for help in translating non-English languages into English. Your attention to these last two items would be greatly appreciated, if you haven't done so already. We want YOU to remain as an active Y.E.S. member or as a subscriber to our journal. If you haven't renewed your membership for 1975 yet, do it now while it is fresh on your mind. Thank!

Our membership fluctuates a bit, so it's difficult for me to hive you an exact count of our members, but at the moment we have about 425 members and subscribers. One of my New Year resolutions is to do everything in my power to see that number grow. Won't you help? Encourage a friend or colleague to join Y.E.S. Or, distribute some of our promotional brochures.

I hope you are pleased with the "new" look of our journal. We made a few minor improvements, most of them having been suggested by members, to make Y.E.S. QUARTERLY even better than before. If you have other ideas, let us know. We can be very proud of OUR journal. Its high quality, both in content and format, have impressed many people. Our journal has been readily accepted by libraries and entomological societies in Saudi Arabia, Argentina, Cuba, Great Britain, France, Canada, and the United States.

Activities and Promotions. **1)** The Swap Box program seems to be working smoothly. There are three boxes in circulation at the moment, and the turn around time seems to be reasonable. We definitely need some specially designed boxes to withstand the rigors of repeated mailings though. **2)** Y.E.S. had its display at the two-day "Insectacular Event" held at the Cranbrook Institute Science Museum in Bloomfield Hills, Michigan. Paul Orselli, a Y.E.S. member who works at the Science Museum and Nature Center, set up the entire event. We appreciated the opportunity to promote our Society. Several other Y.E.S. members from Michigan stopped by to visit and participate in the activities. Several people joined Y.E.S. as a result of the display. We welcome all of our new members!! **3)** I have written to over 150 specimen dealers, biocontrol suppliers, and biological supply houses to obtain information for the compilation of an "Entomology Dealers and Suppliers Directory", which will be published by July 1, 1986. This directory will be unique, and all Y.E.S. members will be sent a free copy. Non-members will have to purchase theirs. I also encouraged all of these dealers and suppliers to support Y.E.S. as it would be a mutually beneficial relationship. **4)** Elsewhere in this issue is the announcement for the "1986 Y.E.S. Writing Competition". You have until June 1, 1986 to get your entry in. You won't want to miss this opportunity to compete for one of the magnificent prizes.

As always, if you have any complains and problems, or suggestions, ideas, articles, illustrations, special requests, or whatever, please don't hesitate to write to me.

Gary A. Dunn
Y.E.S. Advisor

EXTRA! EXTRA!

Announcing:

1986 Y.E.S. WRITING COMPETITION

Theme:

(1) Y.E.S., It's a World of Insects; The Importance of International Entomology

Rules:

(1) Entrants must be youth or collegiate members of Y.E.S.

(2) There will be three entry categories--youth, 8-12 yrs; youth, 13-17 yrs; and collegiate, 18-21 yrs.

(3) You must use the theme topic.

(4) Only one entry per member.

(5) Sorry, papers must be in English.

Awards:

(1) Three awards will be made in each entry category (if there are sufficient entries.)

(2) Top-place winners will be awarded a special prize donated by writing competition SPONSORS: Ianni Butterfly Enterprise, W. T. Kelly Co., Combined Scientific Supply, Flora & Fauna Publications, and MSU Entomology.

(3) Winning papers will be published in Y.E.S. Quarterly, 3(4), 1986.

Judges:

(1) We are working on assembling a panel of qualified judges, and so far the following people have volunteered: Ronald J. Priest, Carolyn Klass, Bryant Mather, Eugene Gerberg, Lane Smith, Ross Arnett, Eugene King, and Jay B. Karren. The judges decisions will be final!

Submission Guidelines:

(1) There is no specific minimum or maximum length. Quality--not quantity--is what counts. However, please submit double-spaced, typewritten copy, or a reasonable facsimile.

(2) Be sure to include your name, address and age on the paper.

(3) Be sure to make and keep a photocopy of your paper. The receipt of all papers will be acknowledged in writing, so you will know when your paper has been received.

(4) Mail entries to: Y.E.S. Writing Competition, c/o Department of Entomology, Michigan State University, East Lansing, MI 48824-1115, U.S.A. Papers must be postmarked by June 1, 1986.

COLLECTING CICINDELIDAE IN THE SOUTHWESTERN UNITED STATES IN LATE JULY, 1985.

John Hutchings
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U.S.A.

This is the account of a collecting trip which took place during the last week of July, 1985, from Long Beach, California to Dallas, Texas. The primary objective of this excursion was to collect Cicindelidae (tiger beetles) in parts of Arizona, New Mexico and Texas.

The following specimens were collected: Megacephala carolina Linnaeus, Cicindela repanda Dejean, C. hirticollis Say, C. pulchra dorothea Rumpp, C. nigrocoerulea LeConte, C. punctulata Oliver, C. punctulata chihuahuae Bates, C. tenuisignata LeConte, C. sedecimpuntata Klug, C. occellata Klug, C. ocellata rectilatera Chaudoir, C. haemorrhagica woodgatei Casey (?), C. trifasciata ascendens LeConte, C. praetextata erronea Vaurie, C. praetextata fulgoris Casey, C. togata fascinans Casey, C. wickhami W. Horn, C. lemniscata LeConte, C. lemniscata rebaptisata Vaurie, C. viridisticta arizonensis Bates, C. cuprascens LeConte, C. macra ampliata Vaurie, C. sperata LeConte, and C. marutha Dow.

July 25.

California, Imperial Co., Salton Sea; the area south of Desert Shores on the east side of the lake was searched for C. californica mojavi Cazier. I have found this subspecies on the west side near Niland in early September. All this was caught this time were a few odd stares from some of the Desert Shores locals.

Arizona, Yuma Co., Gila Bend River; the banks of the river north of Tacna were searched in the early afternoon. Megacephala carolina was abundant under rocks and wood, and a lone specimen of C. tenuisignata was caught on the upper beach.

Arizona, Maricopa Co., Gila Bend; under lights at night on the west side of town C. wickhami were seen lurking at the edges of the illuminated area under a large white light, but due to their size and dark coloration detection was difficult. Once specimen was captured.

July 26.

Arizona, Cochise Co., 4 miles southeast of Wilcox; collecting during late morning along the edges of a small pond produced numerous specimens of C. ocellata, C. sedecimpunctata, C. nigrocoerulea and C. marutha. Species collected away from the pond edges included C. pulchra dorothea, C. punctulata chihuahuae and C. lemniscata. Many of the beetles encountered ran and hid in the grass clumps that predominate this area. Numerous C. nigrocoerulea were found (resting?) under dried cow patties.

Arizona, Cochise, Co., 1 mile west of Willcox; small number of C. punctulata chihuahuae, C. nigrocoerulea and C. sedecimpunctata were collected along the edges of a small pond located in a pasture. Single specimens of C. haemorrhagica woodgatei (?) and C. viridisticta arizonensis were additionally caught.

Arizona, Cochise Co., Willcox Dry Lake; the playa was searched in late afternoon for C. willistoni sulfontis Rumpp and C. nevadica citata Rumpp. The playa was very dry as the rains, which normally come to this part of Arizona in late July, had not yet arrived. No specimens were caught.

Arizona, Cochise Co., Willcox; collecting at lights on the west end of the town produced specimens of C. marutha, C. ocellata and C. praetextata erronea.

July 27.

Texas, Hudspeth Co., 5 miles east of Salt Flat; at the Salt Lakes large numbers of C. togota fascinans and C. praetextata fulgoris were found. The pursuit of these beetles proved very difficult as much of the lake was covered with thick mud due to recent rains. After extensive collecting, however, a decent series of each was taken. On the south side of a road next to one of the lakes, along a water filled ditch, a small number of C. ocellata rectilatera were taken.

Texas, Culberson Co., Van Horn. Collecting at lights on the west end of the town produced a very good series of C. lemniscata rebaptisata and M. carolina.

July 28.

Texas, Parker Co., Brazos River at Highway 20; in late afternoon on the narrow banks of the river specimens were taken of C. macra ampliata, C. sperata, C. repanda and C. ocellata rectilatera.

July 29.

Texas, Cook Co., Red River at Highway 35; on the wide banks of the river large numbers of C. cuprascens and C. hirticollis were found, and a good series of both was taken. Small numbers of C. repanda and C. trifasciata ascendens were additionally caught. This inland population of C. trifasciata ascendens consisted of individuals with very light elytral markings. C. punctulata was captured on a sandy path leading to the river.

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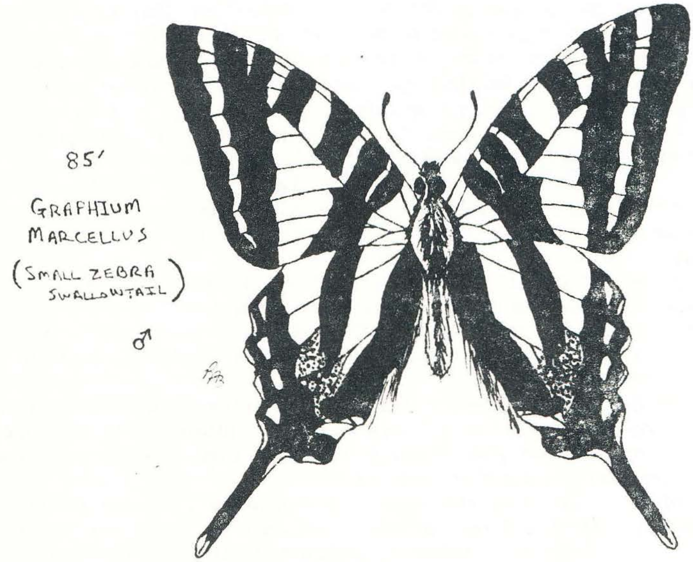

Drawing by: Ryan A. Bridge, York, PA

COMPUTERS IN ENTOMOLOGY

Dale Hoopingarner
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U.S.A.

Computers are threading their ways into our lives in many areas. One perhaps surprising place is in entomological research. Computers can be used as a research tool to aid in understanding biological systems, in data storage and retrieval, and as a teaching aid.

Computers and entomology may seem to be on the opposite ends of the spectrum. Nature is the habitat for the world's many insects, while computers normally reside in high-tech installations where the appearance of any insects brings on the exterminators. However, computers are being used in many areas of entomology and we can expect many more applications in the future.

Computer Simulation

Computer simulation is perhaps the most important use of computers in entomology today. Simulation is practiced in almost every scientific discipline, and for good reason. Many times direct experimentation is impractical or impossible; instead, a computer can be used to simulate the experiment.

Simulation has been used in many areas already. Highly successful models have been used to help understand the economy, various businesses, population and the environment. In addition, many models are now being created by entomologists.

As an example of such, consider the researcher that is working with honeybees. For any experiment to be valid, a researcher must have enough replicates, or repeated tests, to be sure the results are accurate. This may mean that an apiculturalist may need dozens of honeybee colonies for a single experiment. On a lean research budget, such experiments may be too costly to perform. However, by utilizing computer simulation, much information can be gained without direct experimentation.

Highly successful computer models have been created for many entomological systems. Models have been written to study the African locust plagues, honeybee pollination, honey production, alfalfa weevils, and the Gyspy moth.

Oftentimes, it is just too time-consuming to play with a real system to do "what if" kinds of tests. Sometimes, this direct experimentation is impossible. Consider the Gypsy moth problem. How would a researcher convince a hatch of Gypsy moth larvae devouring foliage to conform to his or her experimental plan?

Another use of computer models is for training purposes. This is akin to the computer flight simulators used by pilots. A well-designed simulation program can give students hands-on experience in learning the complex interrelationships of an ecosystem.

A third area that computer models are used for is known as the "black box" problem. Most often, the inner workings of some real system are unknown. By trying to create a (mathematical) computer model, the researcher can be lead to a clearer understanding of the model. Going back to the honeybee example, suppose the researcher is trying to predict honey production via a computer model. This immediately leads to questions like: How much nectar does a bee get from a flower? How does weather affect the amount of honey produced? How many foraging trips does a bee make a day? By solving these questions as they arise, either by experimentation or by checking existing literature, a better understanding of the natural system results.

Artificial Intelligence

Artificial intelligence is a phrase being kicked around a lot, but as yet there are few practical applications in use. One proven use is in the area of expert systems. An expert system is essentially a computer program that asks a series of questions to help the user solve some problem. For instance, such a program could be created to help identify insects. Some of the simpler expert systems are really nothing more than a computer version of the familiar taxonomic key. The more complex systems are capable of adding to their "knowledge" when the program encounters new input, such as a new species of insect.

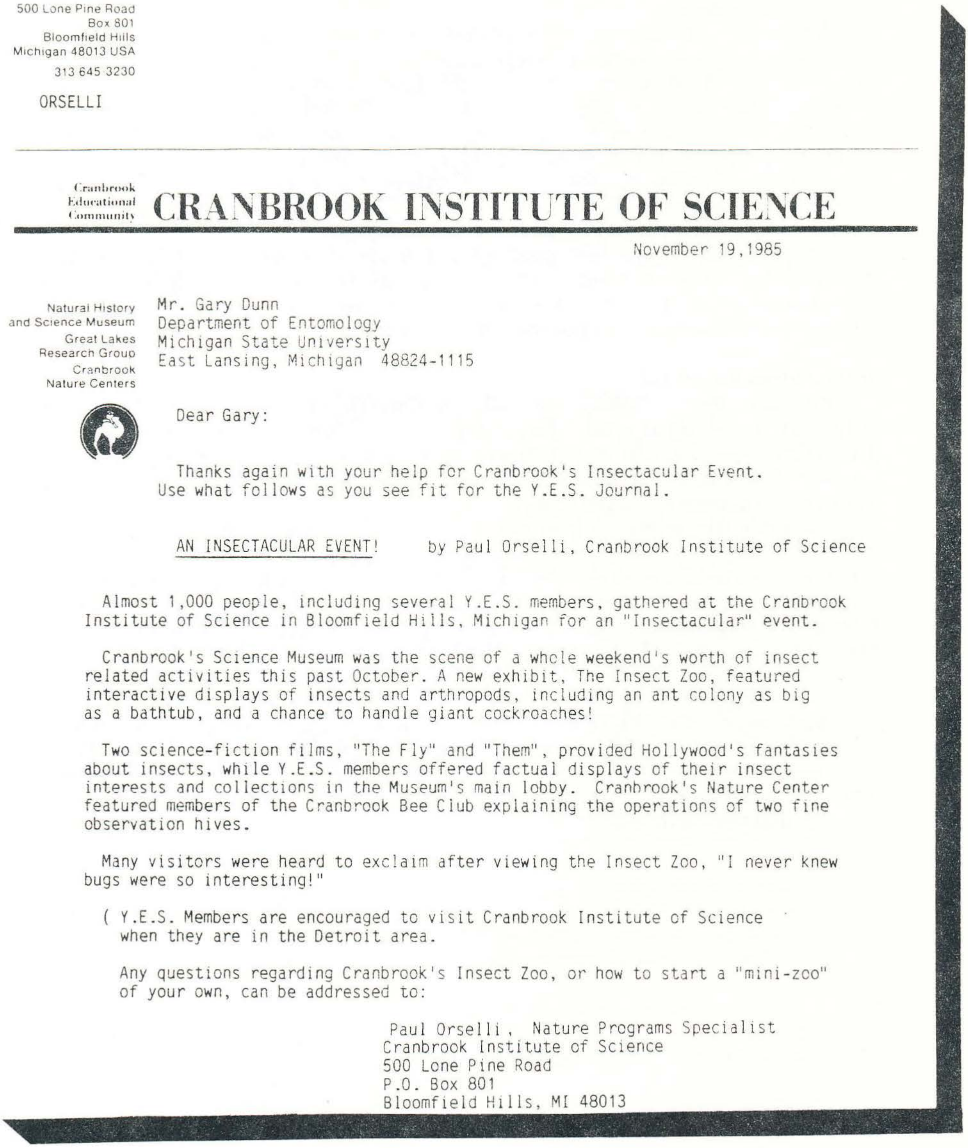
To date, there are few good expert systems available. The ones that do exist are very specific. The medical profession has been using some for several years to aid in the diagnosis of diseases. There is much room for work in this area of computers and entomology.

Information Retrieval

Perhaps the simplest use of computers in entomology is in the information retrieval area. The most common form of this is in taming the literature monster. In entomology, as with any science, keeping up on the current literature can easily become a full-time job. Computers can help relieve this burden for researchers.

Consider the scientist who gets an idea for a new experiment and wants to check on what his peers have done recently in the area. Without a computer system, the researcher would be forced to manually browse through page after page of literature in the hope of finding the information in question. With the proper computer software, however, the search can be done in a matter of minutes. Most systems that perform this task are "keyword" based. Each article or book is assigned one or more keyword that summarize the content of the text. This article, for example, could have the keywords "COMPUTER", "INFO RETRIEVE", and "SIMULATION". When a search is desired, the user merely asks the computer to list all documents that have the chosen keyword or keywords, and within seconds the requested list is available. The scientist then merely pulls out the listed articles and begins to read.

MAIL BAG



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CRANBROOK INSTITUTE OF SCIENCE

Natural History
and Science Museum
Great Lakes
Research Group
Cranbrook
Nature Centers

November 19,1985

Mr. Gary Dunn
Department of Entomology
Michigan State University
East Lansing, Michigan 48824-1115

Dear Gary:

Thanks again with your help for Cranbrook's Insectacular Event. Use what follows as you see fit for the Y.E.S. Journal.

AN INSECTACULAR EVENT! by Paul Orselli, Cranbrook Institute of Science

Almost 1,000 people, including several Y.E.S. members, gathered at the Cranbrook Institute of Science in Bloomfield Hills, Michigan for an "Insectacular" event.

Cranbrook's Science Museum was the scene of a whole weekend's worth of insect related activities this past October. A new exhibit, The Insect Zoo, featured interactive displays of insects and arthropods, including an ant colony as big as a bathtub, and a chance to handle giant cockroaches!

Two science-fiction films, "The Fly" and "Them", provided Hollywood's fantasies about insects, while Y.E.S. members offered factual displays of their insect interests and collections in the Museum's main lobby. Cranbrook's Nature Center featured members of the Cranbrook Bee Club explaining the operations of two fine observation hives.

Many visitors were heard to exclaim after viewing the Insect Zoo, "I never knew bugs were so interesting!"

(Y.E.S. Members are encouraged to visit Cranbrook Institute of Science when they are in the Detroit area.

Any questions regarding Cranbrook's Insect Zoo, or how to start a "mini-zoo" of your own, can be addressed to:

Paul Orselli, Nature Programs Specialist
Cranbrook Institute of Science
500 Lone Pine Road
P.O. Box 801
Bloomfield Hills, MI 48013

BEETLE COLLECTING IN JAMAICA, WITH SPECIAL NOTES ON THE TIGER BEETLES

Gary A. Dunn
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U.S.A.

Many months had passed since paying for our trip to Jamaica, but now my wife, Kris, and I were actually driving to the airport in Lansing, Michigan to catch a plane for the West Indies. We changed planes in Chicago and by early afternoon we were at the Miami International Airport. Here we again changed planes for our final leg of the trip to Montego Bay, Jamaica.

While waiting in the Miami terminal, we ran into Dr. Michael Ivie of Ohio State University, a fellow member of the Coleopterists' Society. We were all on our way to the Florida Entomological Society meetings in Ocho Rios, but the topic of conversation centered mostly around the prospects for good beetle collecting. Our flight to Montego Bay was delayed because someone forget to put jet fuel in both wing tanks, but after a seemingly endless half hour we left for Montego Bay.

After getting our baggage and clearing Jamaican customs and immigration we boarded a bus for Ocho Rios. The 90 mile ride along the north coast of the island takes a full two hours and it seemed like we would never get to the hotel.

After checking into the hotel, we exchanged some of our U.S. dollars for Jamaican dollars. The exchange rate was $U.S. 5.80 to $J 1.00, and consequently the Jamaican prices were 4 to 6 times higher than those in the States. It took a while getting used to hamburger prices of $J 10.00 (even if it was equivalent to prices back home).

The next morning (Tuesday, August 6), Mike and I decided we should try to get out and do some collecting in the Ocho Rios area. We were told the area south of Ocho Rios, beyond an area known as Fern Gully, was worth checking out. The most immediate transportation we could find was a taxi and it cost $J 60.00 for the one-way ten-mile trip out to a small village called Walker's Wood.

The driver was quite puzzled when we asked to be dropped off in the middle of nowhere. He counted his money and drove off to Ocho Rios. The area we selected was a large sloping valley -- grassed on the lower half and forested on the upper half. The entire area was used to graze cattle but no animals were present. The beetle collecting was very poor and all I could find were 5 specimens of a rather drab, 10 mm long tenebrionid beetle.

We set up Mike's Malaise trap in a forest clearing and then decided to head back toward Ocho Rios. On the way back through, the grassed pasture we noticed a pile of cow dung that had obviously been worked by scarab beetles. A little digging in the soil beneath the dung unearthed a nice series of a large, all-black dung beetle, Phaenius carnifex (L.).

We flagged down a passing Jamaican motorist and for $J 20.00 he agreed to give us a ride to Ocho Rios. In no time at all we were back at the hotel.

That very afternoon we again headed out to the field. We had been offered a ride by another entomologist, and so Mike and I accompanied Drs. Baronowski and Mead (FSCA, Gainesville, FL) to the east of Ochos Rios along the coast road. We made 3 stops along the way, but neither Mike or I could find any beetles. I did catch one large cockroach, and we saw a few butterflies at one of our stops.

Wednesday (August 7) was spent at the Florida Entomological Society meetings. My display on the Young Entomologists Society was well received and I had many interesting conversations with entomologists from throughout the Caribbean region.

Mike and I had agreed to split the cost of a car rental, so on Thursday Mike, Kris and I left Ocho Rios bound for Hardwor Gap in the Blue Mountains. Automotive travel in Jamaica is hindered by the narrow, winding, pot-hole studded roads that must be shared with pedestrians, bicyclists, cart drivers, and livestock. Also, there was the problem of my unfamiliarity with driving on the left side of the road. We reached our objective late in the afternoon and spent an hour collecting.

I extracted a nice series of 3 Colpodes species (Carabidae) (roysi Darlington, bruesi Darl. and sp. roysi) out of 2 bromeliads, a type of "air plant" that is common in the New World tropics. I also took two other species of carabids, Loxandrus sp & Morion costigerus Darl., from beneath logs. Kris collected a nice "money-bug", a large, red-striped weevil, from her shoe as she tried to put it on. Gradually it was getting late and we still had to return to Ocho Rios. We arrived back at the hotel late in the evening - both tired and hungry from a strenuous day in unfamiliar territory.

Early the next morning, Mike and I again left Ocho Rios. Kris could not be persuaded to join us on an overnight trip to the John Crow Mountains. The trip to Hardwor Gap had been too adventurous for a non-collector's liking. We arrived in the small village of Comfort Castle, located in Portland Parish, about midday. Here we met Drs. Thomas Walker and James Lloyd of the University of Florida. The were conducting research on fireflies and crickets, respectively.

After lunch we all went our separate ways in pursuit of our various insect groups. Two local Jamaican men followed me down to the Rio Grande and ultimately became my guides to the area. The assisted me in sorting through the gravel along the riverbanks. We were able to extract a nice series of tiny carabids (Schizogenius arimao Darl., Perileptus jeanneli, Darl. and P. minutus Darl.).

The afternoon was very hot and humid, so after several hours of collecting we returned to the village "bar" for a cool drink. Many of the local residents tried to sell me non-beetle insects they had caught, but unfortunately their catches were not of interest. Later, each of my Jamaican guides was given $J 5.00 for their assistance even though they had never been officially hired as guides.

Two additional entomologists, a team of Lepidopterists from Guadaloupe, arrived in Comfort Castle shortly after dinner and plans were quickly laid to do some blacklighting that night. We drove south beyond the village of Millbank and proceeded to set up their blacklighting equipment (a generator and mercury vapor lamp, actually).

There was a great many fireflies in the area, and we were treated to a spectacular show in the form of a "firefly tree". Thousands of fireflies aggregated in the crown of a single large tree, transforming it into a twinkling Christmas tree.

There was another incident involving a firefly that evening. Mike Ivie was out collecting fireflies, and in his intent concentration failed to detect the presence of a curious, local Jamaican resident who had walked up in the darkness to watch the strange white man with the headlamp and net. As Mike stalked his prey, he glanced over his shoulder and caught sight of what appeared to be a red firely, and he quickly attempted to nab the specimen in his net. It was, in fact, a glowing cigarette in the hand of the previously-mentioned Jamaican. Both persons were equally startled by the actions of the other, and there were several awkward moments while Mike explained what had happened. The rest of us heard the two of them roaring with laughter from 50 yards distance!

The blacklighting was productive for Lepidoptera, especially Sphingidaidol and Noctvidae, and for some Trichoptera, but Coleoptera were nonexistent. In a gesture of friendship, the Lepidopterists from Guadaloupe gave us the beetles that they had taken at light the previous night in the lot and it was given to me. I assumed it was a common species like trifasciata, but I later found out to the contrary.

Early the next morning (Saturday), Mike and I had to leave for the return trip to Ocho Rios. Before returning the rental car, we drove up to Walkers Wood to retrieve the Malaise trap. The results were not spectacular, but there were at least a few beetles in addition to the Diptera and Hymenoptera.

Sunday, August 11 was our last day in Jamaica. At 6:45 a.m. I got a call from Mike as he was catching the bus to the airport in Montego Bay. He had seen some tiger beetles on a small beach in Ocho Rios and thought I would be interested. He was right. I was awake in an instance, scheming on how I could collect a few beetles before catching my buss to the airport at 10:00 a.m. As it turned out, the weather was cloudy and it showered occasionally. I figured my tiger beetle collecting was doomed. In a desperate gamble, I decided to spend my last $J 25.00 on a taxi ride to the beach to satisfy my curiosity whether the beetles were active or not. Much to my surprise, the beetles were active despite the steady rain. I collected 24 Cicindela carthegena jamaicana and 1 C. trifasciata in 20 minutes while the taxi driver waited. I was pleased with the outcome of the collected and the driver was rewarded for his patience!

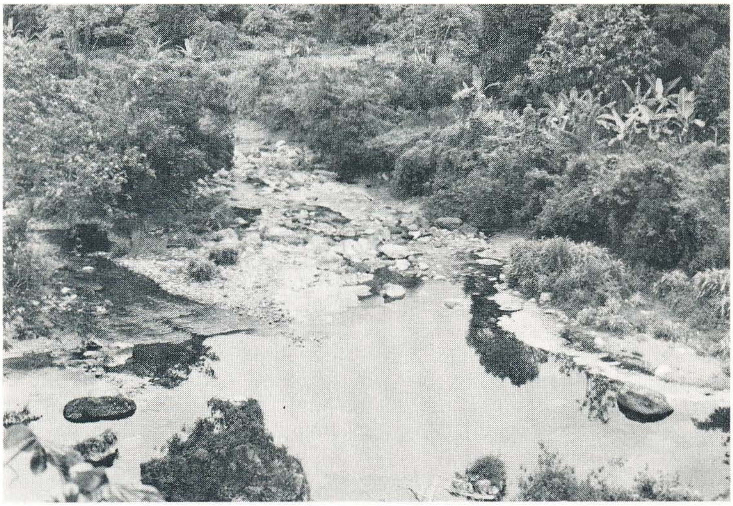
Two and a half hours later, I found myself waiting in line at the airport in Montego Bay. It seems the airline overbooked the flight and 29 people with confirmed reservations and tickets, ourselves included, couldn't get seats on the plane. They put us on another flight later that day, flew us to Kingston, put us on another plane ... To make a long story short, we arrived in Miami 8 hours late and had to spend the night in Miami (at their expense, of course). We finally made it home the next day.

In my hotel room in Ocho Rios, I had examined the tiger beetle the French Lepidopterists gave me that night in Millbank. I immediately recognized that it was NOT Cicindela trifasciata, but I could not put a name on it. It remained a puzzle until I got home. Once at home in my collection room, I was quickly able to key it out. It turned out to be Cicindela boops known primarily from Cuba, and Puerto Rico. More recently it was discovered on Grand Turk, S. Caicos and Jamaica. My specimen (male) is one of only 18 specimens known from Jamaica.

The process of preparing for my Jamaica collecting and identifying this rare tiger beetle forced me to become familiar with the tiger beetle fauna of Jamaica by assimilating the many bits and pieces of published information.

At this point in time four species of tiger beetle are known to occur in Jamaica. They are Megacephala carolina occidentalis Klug, Cicindela trifasciata Fabr., C. carthagena jamaicana Br. van Nidek and C. boops Dejean. There is a chance that at least two additional species also occur on the island and remain to be discovered through extensive collecting. They are C. suturalis F. and C. olivacea Chaudoir.

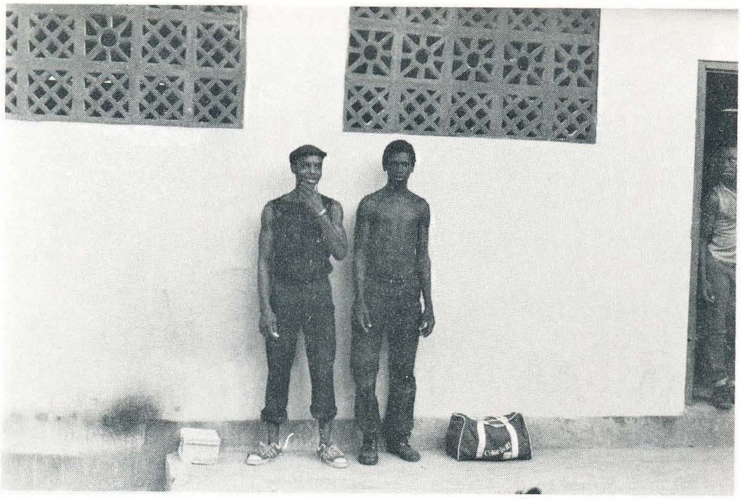
#1 The Rio Grande, between Port Antonio and Comfort Castle in Portland Parish. This river flows down the northern slope of the John Crow Mountains in northeastern Jamaica. It is one of the two largest rivers on the island.



#2 The Rio Grande at Comfort Castle, Portland Parish, Jamaica. Specimens of Schizogenius arimao Darl., Perileptus jeanneli Darl., and P. minutus Darl. (Coleoptera: Carabidae) were collected by digging in the loose gravel and cobblestones along the river.

#3 Rio Grande, village of Comfort Castle, Jamaica. Closer view of Schizogenius and Perileptus habitat. Note the bromeliads in the tree branch in the lower right hand corner of the photograph. In the higher mountain areas these are the habitat for Colpodes (Coleoptera: Carabidae), tree crickets and other tropical insects.

#4 The village of Comfort Castle in the John Crow Mountains of northeastern Jamaica. August 1985.



#5 Two willing Jamaican guides/collectors. These two men, local residents of Comfort Castle, worked all afternoon for a small amount of money and they were very happy to have even temporary employment. Although untrained in entomology, they knew the mountain fauna and flora and had picked up some ideas of how to collect insects by watching other entomologists who had been in Comfort Castle earlier that year.

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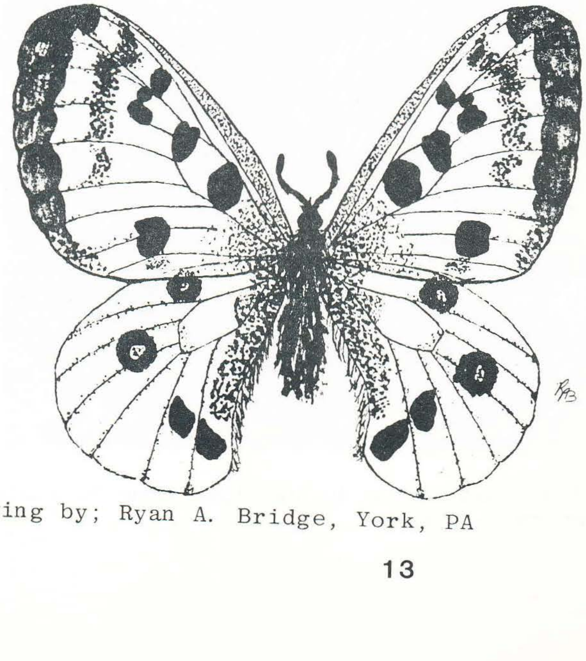

PARNASSIUS
appollo
85'

Drawing by; Ryan A. Bridge, York, PA

INSECT PETS IN JAPAN

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Japanese people in general seem to have a greater love of nature than most Americans. This is manifested in particular by the popularity of observing, collecting, and keeping insects as pets in Japan. I spent quite some time in Japan, and saw many interesting things concerning insect pets that I had never seen before.

Many people keep singing crickets in a terrarium in their homes. The Japanese name for these insects is "Suzumuski", and literally translated, this means "bell-ring insect." I have never heard a more beautiful sound. It is almost unearthly--pure tones of fairy bells, unbelievably beautiful. It's no wonder that these insects are popular in Japan. I understand that they have been kept in captivity for hundrends of years.

Another insect that is very popular, especially with children, is a fascinating rhinoceros beetle that has horns that make its head look like a Samurae helmet. As a matter of fact, the Japanese name for this insect, "Kabutomuski," means "helmet beetle." The large larvae of these beetles live in rotting wood, and are common in Japan. They are also reared by many people, and both pupae and adults are sold in pets stores. They are also sold in department stores (usually in the adult stage), and even in train stations by street vendors. They are kept in small cages or terrariums and given slices of fruit or vegetable (such as cucumber) for food and moisture.

In one large department store in the pet section, I saw several kinds of aquatic insects for sale. They were stocked just like tropical fish. One tank contained large waterscorpions (family Nepidae), which are predaceous aquatic bugs with raptorial front legs (like a praying mantis has). Another tank had what looked like large green and yellow water scavenger beetles (family Hydrophilidae), and the third tank had what appeared to be large brown predaceous diving beetles (family Dytiscidae). It was quite a sight to see them all actively swimming around in the aquariums.

At another department store, large singing katydids were being sold. At various stores, small insect cages could be purchased, and at most pet stores, insect food could be bought for the various kinds of insects commonly kept as pets. It was usually packaged in sealed plastic packets inside a box with directions on how it use it, just like you would buy packaged food for humans at a supermarket.

Maybe we'll see some things like this in the United States in the future. Do you think it would succeed here.?

THE MIDDLE SCHOOL INSECT CLASSIFICATION UNIT

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The purpose of my fall insect studies unit at Van Hise Middle School is to introduce my students to the process of scientific classification based primarily upon visual observation. By looking closely at insects which they have captured, students learn to place their specimens into groups or orders based upon characteristics previously established by entomologists. Simply, stated, this means looking at similarities and differences.

We begin by noting that members of the animal kingdom can be placed in subgroups called phyla and that one of these, the arthropods, is a very large group whose members are invertebrates, having an exoskelton and segmented bodies and body parts. Of these, the insects are those arthropods which have three distinct body parts, a variety of specialized mouth adaptations, and possibly wings or antennae. As such, insects can be distinguished from spiders, ticks, mites, harvestmen, catepides, or millipedes even though all of these are frequently classified by students as bugs. Insects as is then learned, can be further subgrouped into orders and only one of these groups is knows as the true bugs.

I use overhead transparencies to develop each of these subgroup concepts (Fig. 1). I begin with one showing a row of pictures of animals which are arthropods followed by one showing a row of animals with no arthropods. A third row follows containing a mix of arthropod and nonarthropod pictures. Students must identify which animals are arthropods. The same procedure is repeated using pictures of arthropods and insects, and finally insects and one of the common orders such at beetles. Each transparency forces students to think about grouping based upon similarities and differences and that, of curse, is the focus of our concurrent discussion.

Once this thought sequence has been established students are given handouts which list the scientific names of ten common orders of insects, including a brief physical description and list of common names. The lab students are asked to observe and classify live crickets, flies, cockroaches, mealworm beetles, tarantulas, isopods, and whatever else I can procure. At this time I also hang vocabulary mobiles from the ceiling (Fig. 2). On one side in black outline is a picture representing and order. Below this is the scientific names of that order. On the flipside is a list of several common names of the order's members.

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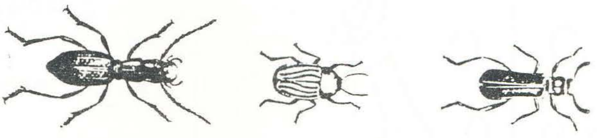
*(Editor's Note: Early last year Mr. Leidel contacted me for resource materials on insect rearing for use in his insect classification unit for middle school units. In addition to supplying him with some materials, I also challenged him to prepare an article for Y.E.S. Quarterly telling bout the teaching method he used in his classroom. I am happy to report that he has met my challenge, and that he has agreed to share his experiences with use in this article. Furthermore, he encouraged his students to submit their work to Y.E.S., and we will be using it in this and the issue of our Journal.)

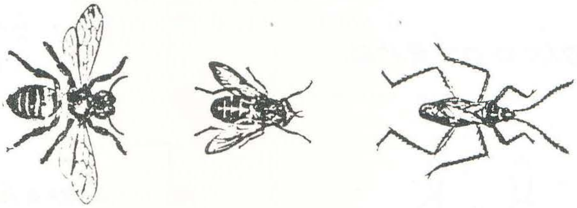
Students are then asked to collect at least one member of each of these common orders. The choice of orders has been determined by which specimens students have most frequently brought in over the last few years. Presently these orders include coleoptera, lepidoptera, orthoptera, odonata, hemiptera, homoptera, diptera, thysanura, hymenoptera, neuroptera, and occasionally dermaptera and mecoptera. Specimens are pin mounted and labeled by order and common name. Small school storage boxes are sufficient to accommodate collections of this size. We cut pieces of styrofoam platters from the grocery store to fit into the bottom of these boxes so that students may easily pin their insects inside. We also stick in mothball melted onto the head of a pin. Students are evaluated on the number of different orders of insects which they can properly identify and mount. By unit's end most students can accurately classify common insects and correctly use scientific vocabulary.

Figure 1.

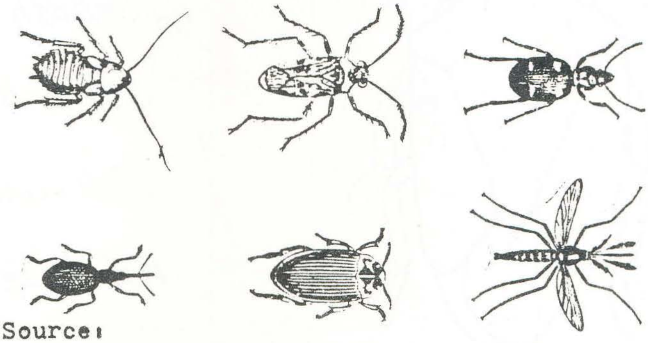
ALL OF THESE ARE BEETLES.



NONE OF THESE ARE BEETLES.



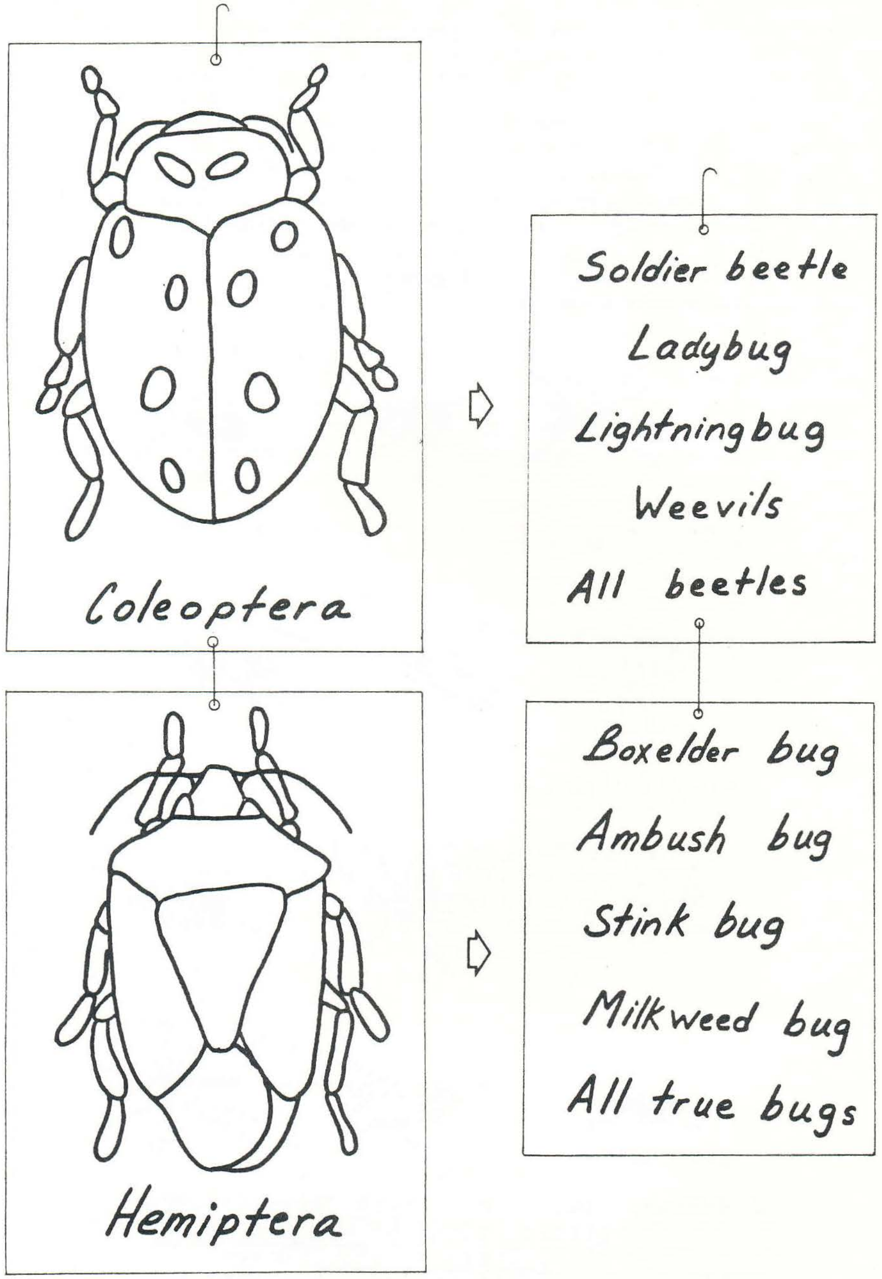
WHICH OF THESE ARE BEETLES?



Source:

Harter, Jim. Animals: 1419 Copyright-free Illustrations of Mammals, Birds, Fish, Insects, etc., Dover Publications, Inc., New York, 1979.

Figure 2.


Coleoptera
Soldier beetle
Ladybug
Lightningbug
Weevils
All beetles
Hemiptera
Boxelder bug
Ambush bug
Stink bug
Milkweed bug
All true bugs

WEIGHT-LIFTING INSECTS

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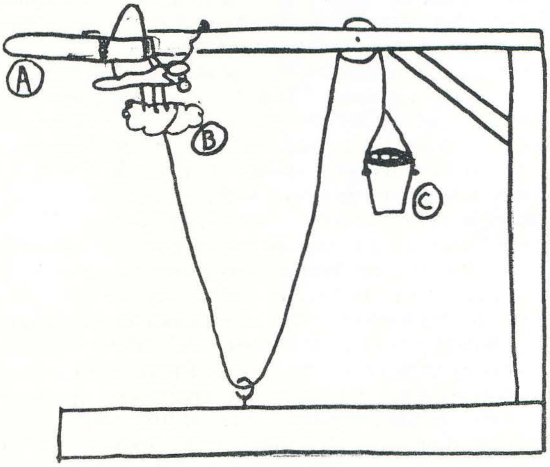
Have you ever tried to lift a butterfly off a rock? For this size they are pretty strong. But how strong are they really? I decided to try a little experiment to find out.

I decided to use three common insects: a monarch butterfly, a mealworm bug and a cockroach. My teacher gave me a machine to help me measure the holding strength of insects (Fig.1). The insect is placed in the clothespin (Fig. 1, "A"); of course you can protect the insect by putting something around it. Then a piece of gauze (Fig 1, "B") is placed under the insect so it can grab it with its legs. Then you can begin the experiment by dropping weights into the plastic cup (Fig. 1, "C").

The monarch butterfly was easily placed in the clothespin. The mealworm and cockroach presented problems because you couldn't put them directly in the clothespin. Doing so would smash them. I finally solved this problem by attaching pieces of fishline to the mealworm and cockroach using melted candle wax.

The results of the test were very interesting. The monarch first "lifted" 10 grams, then 52g, then 45g, and finally 51g. The mealworm bug couldn't lift a thing. An then the most surprising part: the cockroach "lifted" 70g, and then the wax broke. In the future I will need stronger, less brittle wax.

Figure 1.



TENT CATERPILLARS

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Tent caterpillar moths (Lasiocampidae) are an insect problem in Madison, Wisconsin. They defoliate many trees and shrubs by feeding on the leaves, buds, and flowers. Some of the trees that tent caterpillars like to live in are oak, elm, ash, conifer, apple, and cherry trees. Van Hise Elementary School has had caterpillars in its crabapple trees. In our yard we found them in a branch of a white birch tree.

Tent caterpillars are of medium size with stout, hairy bodies. They are yellow-brown to red-brown in color. Their legs and even their eyes are hairy. The antennae of both adult sexes are feathery. Females are like the males, but larger.

Eggs of tent caterpillar moths are laid in a collarlike layer around a twig of the tree show foliage will provide food for them. Eggs also can be laid in flattened masses on the bark of limbs or trunks of trees. The number of eggs per mass ranges from 100 to 400, but is usually from 150 to 250. As the eggs are deposited, they are covered with a thick, brown, foamy substance which hardens. They hibernate in the eggs stage, which usually lasts bout 9 months.

Hatching occurs in the spring, about the time the new leaves of the host tree appear. Young larvae feed first on eggs shells, then on the bugs and young leaves. The larvae are yellowish to brown or black, with blue of orange spots and lines. They are covered with long fine hairs. They live in colonies and generally construct tents if forks of trees for shelter and for protection from predators. Trails of silk are spun by the larve as they move away from the nest to feed.

When their food supply becomes scarce, they may migrate long distances in search for other food. As they increase their size, the catepillars enlarge their tent by making more of a gauzy, weblike material. Sometimes a tent is so large that it covers an entire branch or several branches. The caterpillars may even eat every leaf of the tree.

When fully grown, the larvae wander about seeking protected places in which to spin their silky cocoons. The cocoons are about 1-inch long and fairly loosely constructed. Cocoons may be found within the old tents, inside logs, beneath loose bark, and between folded leaves. Each larva spins its own cocoon and lives by itself in it until the following spring. Then the cocoon splits, releasing an adult moth.

There are several types of tent caterpillar moths. The Eastern tent caterpillar is found throughout the southern part of eastern Canada and the eastern half of the United States, and feeds on cherry, prune, peach, apply, hawthorn, and other deciduous trees and shrubs. The California tent caterpillar occurs throughout most of western North America and feeds on poplar, aspen, willow, oak, bittersweet, and other shrubs. The prairie tent caterpillar occurs throughout the Great Plains area east of the Rocky Mountains to central Texas. Its hosts are choke cherry, willow, and wild plum. The Sonoran tent caterpillar lives in the southern Great Plains, southern Rocky Mountains, the Southwest, and Mexico. Its host plants are various types of oaks. The western tent caterpillar ranges from the Pacific Northwest and coastal region eastward through Canada. It fees on alder, willow, poplar, apple, plum, cherry, and other trees.

Tent caterpillars can build up huge populations over large areas. There webs are unsightly, and trees may be almost or completely defoliated and young fruit destroyed.

However, it is not difficult to control the tent caterpillars in forests, orchards, or individual yards.

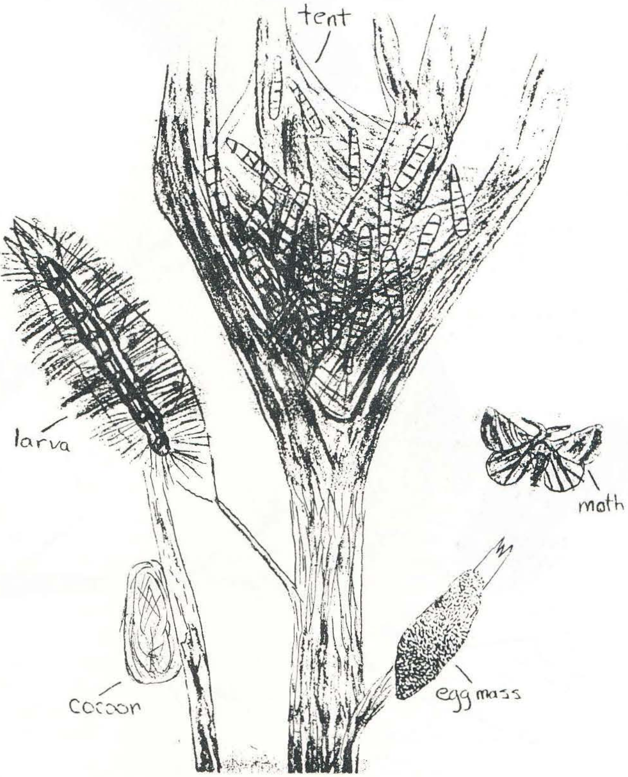
Tent caterpillars have natural enemies. Many different wasps, flies, and beetles attack them. Yellow and black billed cuckoos and more than 40 other birds eat them.

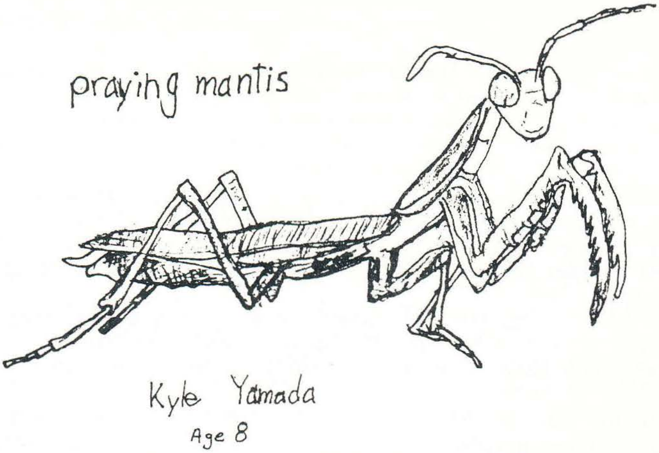
Homeowners should look for egg cases on the tips of branches. They look like wide wedding bands made of clay and remain on the trees through the winter, so they can be checked after leaf-drop. They should be removed and dropped in a can with several inches of oil in the bottom to destroy the eggs.

The caterpillar tents are very noticeable when they are in trees. The affected branches should be cut off the trees and then burned. This is what our neighbors have done with caterpillars they have found in their trees.

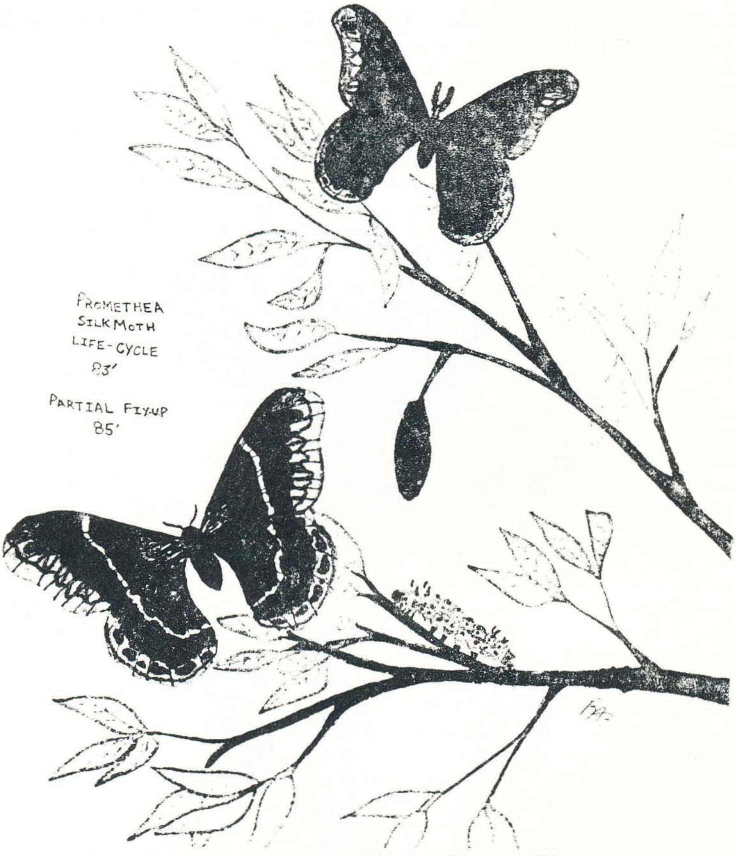
To keep the caterpillars from invading trees, the lower section of leach trunk can be wrapped with aluminum foil. The foil should be fastened securely with electrical tape at both the top and bottom and a ring of crankcase oil should be painted around the center of each foil strip.

Foliage of infested trees can be sprayed with a stomach-poison or contact insecticide to kill the caterpillars.





Drawing by: Kyle Yamada, Corvallis, OR



Drawing by: Ryan A. Bridge, York, PA

THE MYSTERIOUS DRAGONFLY

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Dragonflies were among the earliest flying insects to evolve on earth, first seen more than three hundred million years ago. The common name dragonfly was given to them because they look like small winged dragons. They are members of the order Odonta. There are more than five thousand species of dragonflies and damselflies.

Dragonflies are very colorful. They are many different colors: powder blue, blood red, orange, and bright green. Their gossamer wings are marked with patches of scarlet, gold, white, or black that flash and sparkle over ponds and rivers in spring and summer. Their transparent wings make a loud buzzing sound as they move up and down.

Dragonflies vary in size. Millions of years ago there were enormous dragonflies, one of which had a wingspread of nearly thirty inches. The largest dragonflies today, though, measure up to three or four inches.

The dragonfly has amazing power. It can beat its wings between 20-30 beats per second! Their flight speed is even more incredible--24 to 36 miles per hour! Dragonflies are the fastest and strongest insect fliers. Sometimes they travel long distances. This is unusual for an insect. This is possible because dragonflies don't need much energy. Also, because dragonflies eat flying insects, they are able to eat while they are aloft. Dragonflies eat insects such as mosquitoes and flies and are considered a very beneficial insect.

Some studies have shown that a dragonfly can see objects up to forty feet away--a great distance for an insect. This may be attributed to the fact that dragonflies have such large compound eyes. (This means they have eyes with about 2,5000 small lenses or facets. They're arranged on a curve so that each focuses in a slightly different direction.)

But what do they do before becoming fully grown? In a dragonfly's life there are three different growth stages (incomplete metamorphosis). The first stage is the egg. All eggs are laid on or in the water, perhaps inserted on a water plant or laid on the murky bottom of the stream. The dragonfly eggs may be laid one by one or in a cluster of up to eight hundred eggs.

Approximately a week after the eggs are laid a nymph emerges from the egg. When the nymph first hatches, it is tiny, only 1/16th of an inch. By the end of its development, a dragonfly will be about 20 times its original size. Nymphs feed on small water animals. Nymphs usually hung by waiting for their prey instead of chasing it. When their prey get near enough, the nymph whips out its special lower lip, called a labium, and with the help of the graspers at the end of it, it grabs its prey.

After feeding for several days the nymph's skin may become too tight, so it sheds the skin. As it grows bigger, it prefers to eat larger insects such as mosquito larvae and then tadpoles or shellfish. Sometimes nymphs will even attack young fish, as big as themselves. So the summer passes and the nymph continues this growing process. The nymphal stage lasts for several months to three years depending on the species of dragonfly. Thus, this is the longest stage in the development of the dragonfly.

Then, on night the nymph crawls out of the water. It then finds a rock or leaf to cling onto and waits for a tremendous change to happen. After a few hours, the outer skin dries and splits open and a full grown dragonfly emerges, looking as if it needs to be ironed! In the next few hours, blood is pumped into the veins and the wings stiffen and expand. By morning, the dragonfly's metamorphosis is complete.

This usually happens in July. Full grown dragonflies only live until late September at the latest. Before they die though, they lay eggs for next years dragonflies.

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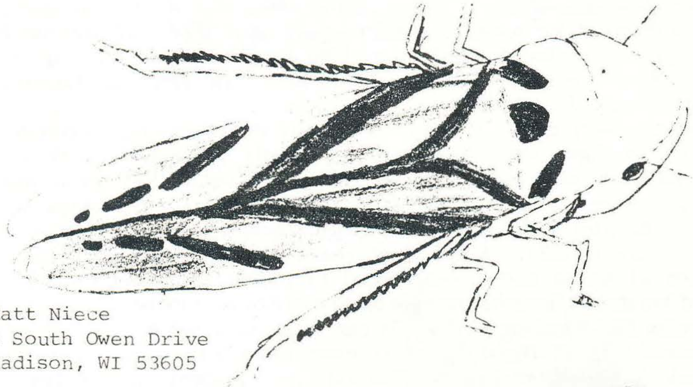

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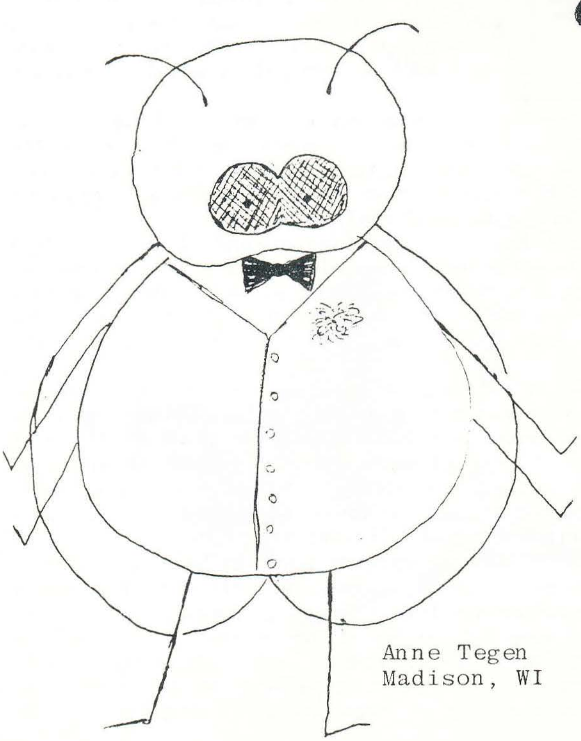

Anne Tegen
Madison, WI

MOSQUITOES

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One of the insect problems that we have is mosquitos. There are about 2,000 species of these 2 winged insects. They are found from the tropics to the arctic and even on high mountains. Mosquitos are becoming a major problem in this area. There seems to be a drastic rise in the population of mosquitos. There are 30 to 40 kinds of mosquitos in Wisconsin. Altogether there are billions of mosquitos in our state. The rise in populations seems to be because of the increased amount of rain. Female mosquitos lay their eggs in water. The eggs can remain dormant for years until flooded.

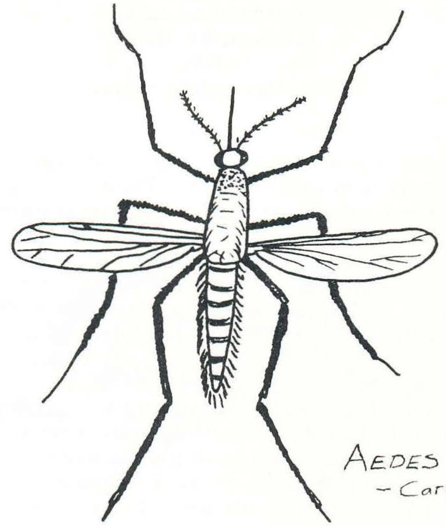
In the past, people used to come around in trucks and spray the neighborhoods with an insecticide that would kill all the mosquitos in the neighborhood. They do not do this anymore because the insecticide, DDT, is now illegal because it is dangerous to people and wildlife.

How we get rid of this problem is a big question. Here are some suggestions: hange 'bug zappers' all around the house, set up traps (like mosquito nets) in mosquito infested areas, spray mosquito breeding areas with Raid, or some other insecticide. These are just some suggestions to get rid of mosquitos. In Wisconsin, we put oil and insecticide in breeding areas such as swamps. In other states they spray insecticides in storm sewers.

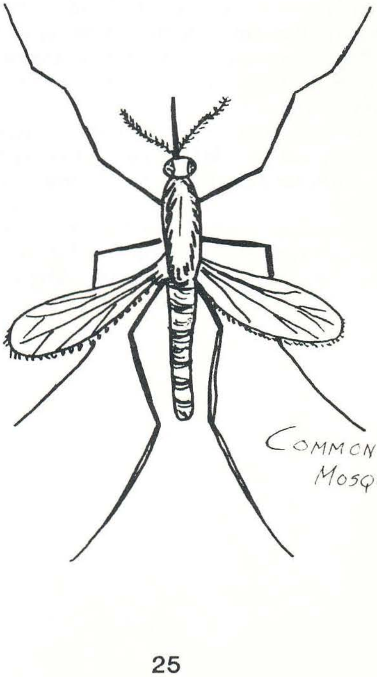
We should get rid of all the mosquitos in the area because they are a nuisance to everyone. They carry disease. The species Anopheles carries malaria, Aedes caries yellow fever, and encephalitis (the 'sleeping sickness') is carried by the common house mosquito. They also suck blood from people and cause 'mosquito bites' which are uncomfortable. Mosquitos are as big a nuisance as trying to put together a model Ferrari, when the instructions are in Japanese.

Mosquitos go through complete metamorphisis. There are four stages: egg, larvae, pupa, and adult. Most mosquitos live about a week, but the female lives for a much longer time. Sometimes she may hibernate for four or five months.

If we want to get rid of this problem we must act quickly, or it will become a very serious problem. For more information on mosquitos you can call your local Health Department or University Department of Entomology.



AEDES
– Carrier of
Yellow Fever



COMMON HOUSE
MOSQUITO

AN ANT EXPERIMENT

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My experiment consisted of determining what taste sensation the common black ant would prefer. I assumed it would be a sweet substance, but you never can be sure. I was going to conduct this experiment using the four tastes the human taste receptors can detect; sour, bitter, sweet, and salty. Each of these tastes would be made by adding a flavoring to water. To make a salt flavor, I used salt water; for sweet, sugar water. Those two were easy. But for bitter and sour it was a little more difficult. When you first think of sour you think of lemons. They are sour. But they also contain natural sugars when could make them seem more sweet than sour. So I though to myself, what makes lemons sour? Lemons, being a citrus fruit are sour because they contain citric acid. So I obtained a vitamin C tablet, which is citric acid in a tablet. I crushed it and added water, making a sour solution. A bitter taste was by far the hardest to make. What's bitter? By dad told me that beer had a bitter taste (I couldn't confirm this, however), but he also said that it contained some sugar in it. I took his word for it. But if I wanted to keep this experiment controlled, I would have to do better than this. My dad said he could get some sodium hydroxide (lye) from his lab. He said that it was extremely bitter and potent. He brought a tablet of it home and I let it absorb moisture from the air until it dissolved. Then I took the lye droplets and added them to water. I put a wick in each solution and put the four containers out on the ground. I was all set.

First, I let all four containers sit for about an hour unobserved to make even the weariest ants comfortable with feeding from the containers. When I came back there were five ants feeding on the sugar water. I recorded this in my notes and throughout the next hour and a half I observed twelve more ants got to the sugar water, one to the salt, two to the bitter and non to the sour. Then I converted the numbers to percentages: 85% went to the sweet, 10% went to the bitter, 5% went to the salt, and 0% went to the sour solution.

My feelings are that the great majority of ants prefer feeding off of sweet substances, but they are curious about other tastes and will try them if they are presented to them. Finally, I feel they detest sour substances as non of the ants observed even gave the sour substance a second glance.

TIGER BEETLES OF NEW ENGLAND (COLEOPTERA: CICINDELIDAE)

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In spite of the fact that the tiger beetle fauna of New England is relatively small (20 species), there has never been a comprehensive paper on the faunistics of this region of the United States.

The area know as New England is located in the extreme northeastern United States and is comprised of six individual states (Fig. 1). Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont and Maine. Together, these six New England states occupy 63,126 square miles of land territory and stretch 525 miles from the southwest "pan-handle" of Connecticut to the northern tip of Maine.

The tiger beetle faunas of some of the individual states have been investigated. Specifically, these are: Maine (Wilson and Brower, 1983) and New Hampshire (Dunn, 1978 and 1981). No comprehensive information has been published for Connecticut, Rhode Island and Massachusetts.

The data for this paper comes from specimens in the collections of the Museum of Comparative Zoology (MCZ), Harvard University (Cambridge, MA), the University of Massachusetts (Amherst, MA), the University of Connecticut (Storrs, CT), Peabody Museum, Yale University (New Haven, CT), the Connecticut Agricultual Experiment Station (New Haven, CT), the University of Rhode Island (Kingston, RI), the University of New Hampshire (Durham, NH), the University of Maine (Orono, ME) and the University of Vermont (Burlington, VT), as well as the personal collections of Donald A. Wilson (Newfields, NH), John Shetterley (Cambridge, MA), John Stamatov (Armonk, NJ) and the author.

Tiger beetle specimens from New England can be satisfactorily determined using Willis (1968). Dunn (1978) also contains a key to the New Hampshire species.

Annotated Checklist

Megacephala carolina L.

This species reaches the northern limit of its distribution in extreme southwestern Connecticut. Indeed, the northern limit of this beetle correlates reasonably well with the southern boundary of the last glacial ice sheet! This species is abundant in the New Jersey Pine Barrens, and it probably also occurred on Long Island, NY, at one time. The New England distribution is represented by a single specimen taken in Bridgeport, CT (Yale/Peabody Colln.) (Fig. 2).

Adult Megacephala are nocturnal; they occur in primarily in the summer months.

Cicindela longilabris Say

This tiger beetle is indigenous to the northern forested regions of New England. Hence, it is most common in Maine, New Hampshire and Vermont (fig. 2). A single specimen labeled "Mass" exists in the MCZ collection; its status in this state is doubtful. However, if it does occur in Massachusetts, it will most likely be found in the western part of the state.

Most New England records indicate July and August are the best times to look for this species. It prefers roads, trails, and openings in (boreal) forest areas.

Cicindela hirticollis Say
(ssp. rhodensis Calder)

At one time this species could be found in all of the New England states. It is most common along the coastal beaches of Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut. In Vermont this occurs on the shore of Lake Champlain (figure 3). The taxonomic status of the New England populations is open to speculation. All of the coastal populations have thin, often interrupted elytral maculation. The extreme case is the population at Naragansett Bay, Rhode Island (type locality for ssp. rhodensis Calder), where the beetles are darker in color and the markings are virtually disappeared. Additional comments (on the status of C. hirticollis) can be found in Dunn (1981).

Cicindela hirticollis is a spring-fall species, but adults are frequently abundant through the entire summer.

Cicindela repanda Dejean

This is one of the most common tiger beetles of New England. It is widely distributed and occurs in all six states (fig. 8).

This species is most frequently taken on moist beaches, but it can be found on dry soil. It is a spring-fall species, but adults can be taken almost any time from April to October.

Cicindela duodecimguttata Dejean

This species is closely related to C. repanda. Indeed, it was once thought to be a "subspecies" of C. repanda. It is known to occur in Maine, New Hampshire, Massachusetts and Connecticut and there is no reason to believe it does not occur in Rhode Island and Vermont.

C. duodecimguttata is frequently taken in company with repanda; however, it is more likely to be taken at dry sites. In New Hampshire, it is the most common species on gravel roads and gravel banks in the northern part of the state.

Cicindela formosa generosa Dejean

This is the largest tiger beetle of the genus Cicindela to occur in New England. It is recorded from all six of the states (fig. 6). It is widely distributed but only occurs in areas of suitable habitat. This beetle inhabits areas of loose, shifting sand where there is sparse herbaceous vegetation.

This species emerges much later in the spring than most other spring-fall Cicindela. It can be found from mid/late - May until early September.

Cicindela purpurea Olivier

This species is widespread throughout New England, and it is known from all six states (fig. 7). The beetles are generally found as solitary individuals, sometimes in small groups, and they very definitely have a spring-fall activity pattern (March-May and August-October). They are frequently found in large open areas (meadows, etc.) and generally can be found on roads, trails and other bale spots among the vegetation.

C. purpurea is inclined to have melanistic (black) individuals in some populations. Individuals of this color phase, erroneously referred to as ssp. nigerrima Leng, have been taken in New Hampshire and Massachusetts.

Cicindela limbalis Klug

This species is reported from four of the states (Maine, New Hampshire, Vermont and Rhode Island, Figure 8), but there is no reason to believe it does not also occur in Connecticut and Massachusetts. Although found throughout New England, this species is uncommon and occurs as scattered populations inhabiting a specific habitat type. This species prefers steep, bare, hillsides with a high clay content in the soil. They are strictly spring-fall, and apparently the life cycle requires two seasons. Hence, these beetles may at times be extremely difficult to locate and collect.

Cicindela sexguttata Fabricius

This emerald-green tiger beetle is familiar to most collectors in the eastern United States. It is often-times abundant on roads and trails through woods and meadows. It is most active from April until early June, with occasional "stragglers" in mid-summer. Apparently, the newly-formed full adults do not emerge from their pupal chambers, so there is rarely any late summer, early fall activity.

C. sexguttata occurs in all six states (fig. 9). The status of the "subspecies" harrisi Leng is still debated, and it is beyond the scope of this paper to elaborate on the validity of this questionable taxonomic form.

Cicindela patruela Dejean

This relative of sexguttata is much less common. It is known from New Hampshire, Vermont, Massachusetts, and Rhode Island (fig. 10). It has not been taken in any of these states in recent years, so its current status in this region is unknown to this author.

It is very likely that New England is at the northeastern-most limit of this species' range. It prefers open areas among forests where the soil is very sandy. It is a spring-fall species.

Cicindela scutellaris Say
ssp. lecontei Haldeman
ssp. rugifrons Dejean

This species is represented by two subspecies (and intergrades) in New England. C. scutellaris lecontei occurs in Connecticut, western and central Massachusetts, and New Hampshire (fig. 11). Although it has not been found in Maine, Wilson and Brower (1983), speculate that it occurs in the southern part of the state. The same can certainly be said for Vermont.

A complete discussion of this species and its subspecies is contained in Dunn (1981).

Cicindela ancocisconensis T.W. Harris

This beetle has a most interesting distribution. It occurs in the White Mountain region of New Hampshire (fig. 10) (and nearby Maine), eastern Quebec, south-central Vermont, western New York, and many areas in the Ohio Valley and Appalachians (Illinois, Indiana, Pennsylvania, North Carolina, Tennessee, Virginia and West Virginia).

This species has a spring-fall activity pattern and it is most abundant in late May, June and early July.

Cicindela tranquebarica Herbst

This species has been reported from all of the states except Rhode Island, and it no doubt also occurs there (Fig. 13). Like so many of the other species, this one also has a spring-fall activity pattern.

Cicindela rufiventris hentzi Dejean

This subspecies of rufiventris is apparently endemic to the Blue Hills region of eastern Massachusetts (Fig. 14). It inhabits barrer, rocky outcropping of granite. It is a summer species and is most abundant in late June, July and early August.

Populations of the nominate subspecies are known from New Jersey, Central Pennsylvania and western Massachusetts, but there appears to be a substantial gap between the ranges of the two forms. As a result, no undergraduate are known (or expected). Further investigation is definitely warranted.

Cicindela marginipennis Dejean

This species is known from cobblestone bars and beaches along the Connecticut River, between New Hampshire and Vermont (Fig. 15).

The species is uncommon, but localized populations may contain hundreds of individuals. They can be found in July and August. See Dunn (1978) for additional details.

Cicindela punctulata Olivier

This is the most abundant tiger beetle of mid and late summer. It occurs in all six of the New England states (Fig. 16) and inhabits a wide variety of habitats.

Cicindela dorsalis Say .

At one time Cicindela dorsalis was known from Connecticut, Rhode Island, and Massachusetts (Fig. 17). It appears to have disappeared from much of its former New England habitat, and in recent years it has only been found on Block Island (RI). It may still occur on Nantucket and Monomoy Is. (MA). If this species is still to be found it should be look for in July and August.

Cicindela marginata Fabricius

This species is also restricted to saline coastal areas. Therefore, it can be found in Connecticut, Rhode Island, Massachusetts, New Hampshire and Maine (Fig. 18). This species prefers dark, moist beaches and mudflats. Dunn (1978) suggests this species may be subject to the adverse affects of pesticides applied to New Hampshire saltmarshes to control mosquitoes.

Cicindela puritana G. Horn

This is the rarest of the New England tiger beetles. It is known from sand beaches along the Connecticut River in Connecticut, Massachusetts, and New Hampshire (Fig. 19). The last New England specimen was taken on June 27, 1939 in Cromwell, Conn. It has not been taken along the Connecticut River since that time! The status of this species is questionable, and it is unknown whether or not this species still exists on the Connecticut River.

Changes in the Fauna

No tiger beetle fauna remains stagnant. All tiger beetle populations and distributions are dynamic--they change with great frequency. New England tiger beetles are not exception.

New England, especially the southern half, is one of the most densely populated parts of the United States. It is also highly industrialized. The expansion of human populations in New England (and elsewhere around the world) has eradicated many tiger beetle habitats. Those species which inhabit coastal areas have felt the greatest impact. *Cicindela hirticollis*, *dorsalis* and *marginata* have been eliminated from much of their former range in New England. *Cicindela puritana* and *marginipennis* have been affected by changes in the Connecticut River for mans' use--dams, channelization, levees, etc.

Fortunately, not all tiger beetle populations in New England are doomed to extinction. Some survive in parks and native reserves. Other species are able to use temporary, man-made habitats such as sand and gravel pits, roads and trails, etc.

Additional study is needed on the tiger beetles on New England. The most urgent needs are for an assessment of the populations of the endangered coastal species. Intensive collecting and study has yet to be completed in Connecticut, Vermont, Rhode Island and western Massachusetts. Certainly the status of Cicindela rufiventris in western Massachusetts and Connecticut needs to be investigated.

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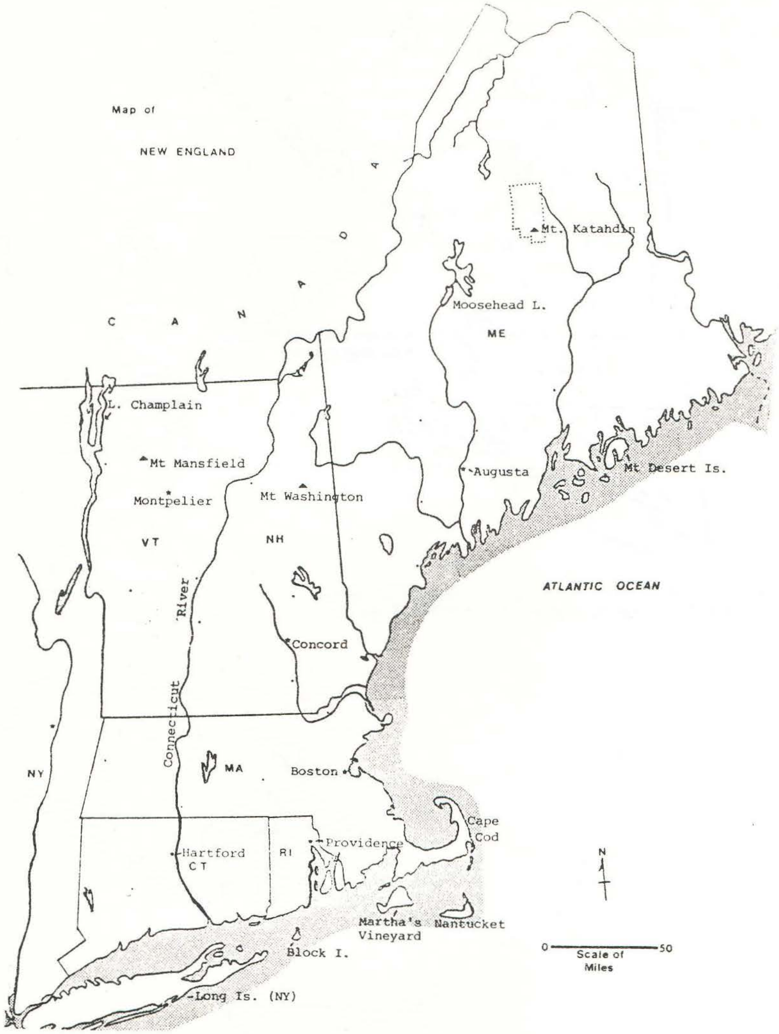

Figure 1. Map of New England, U.S.A.

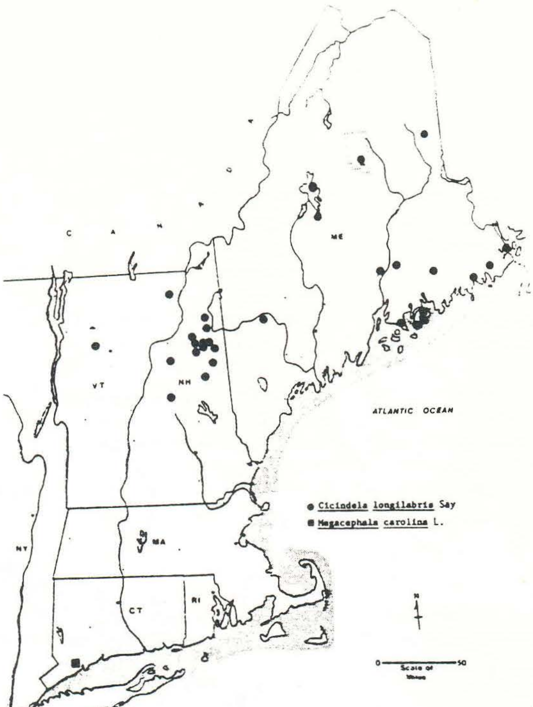

Figure 2. Distribution of Cicindela longilabris Say and Megacephala carolina Linne in New England.

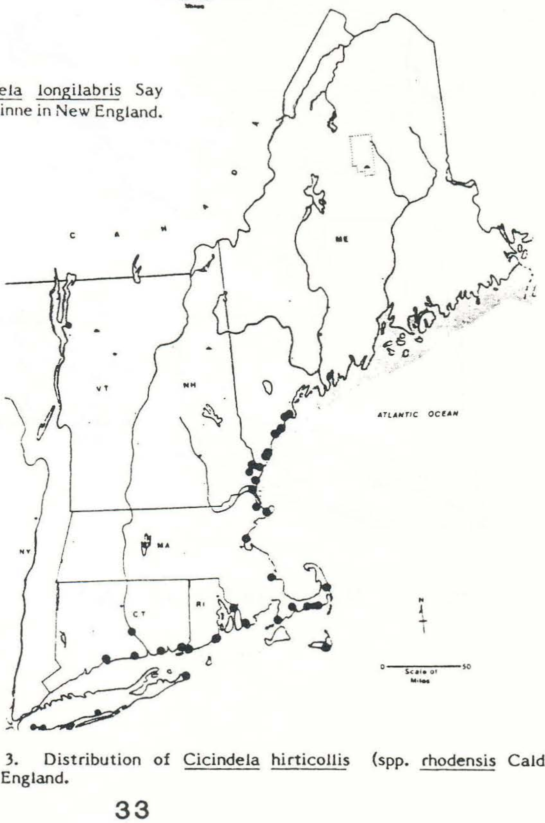

Figure 3. Distribution of Cicindela hirticollis (spp. rhodensis Calder?) in New England.

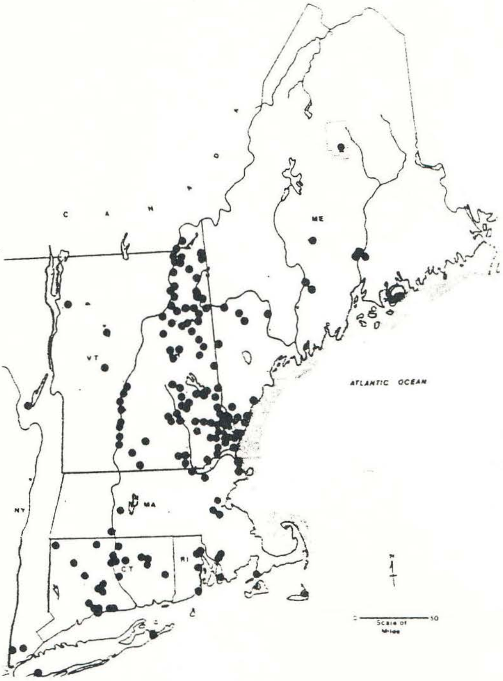

Figure 4. Distribution of Cicindela repanda Dejean in New England.

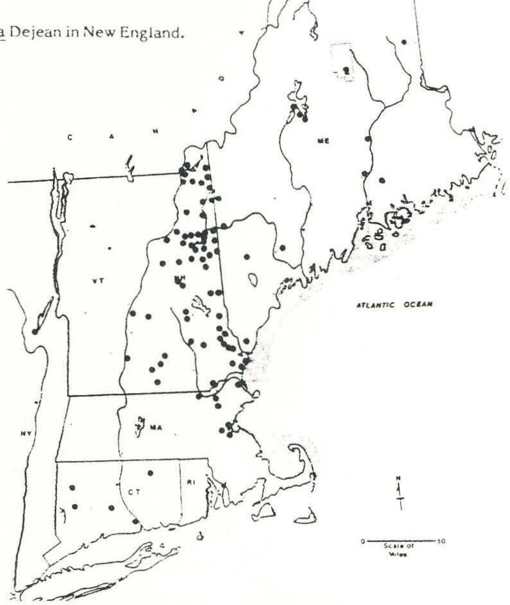

Figure 5. Distribution of Cicindela duodecimguttata Dejean in New England.

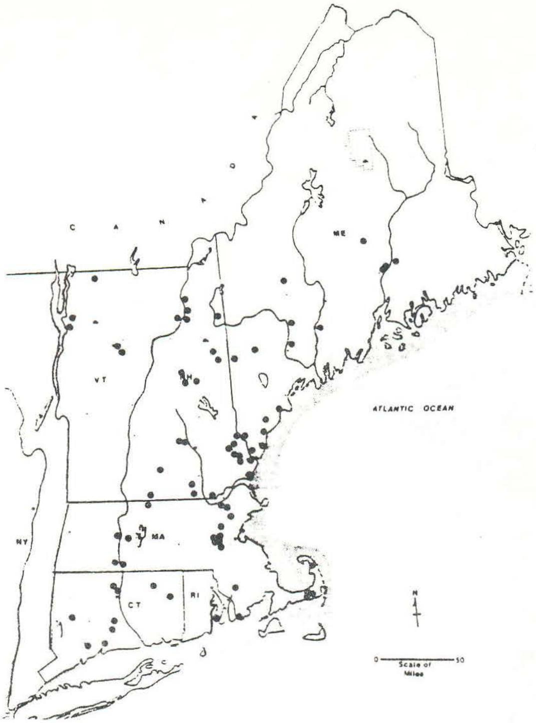

Figure 6. Distribution of Cicindela formosa generosa Dejean in New England.

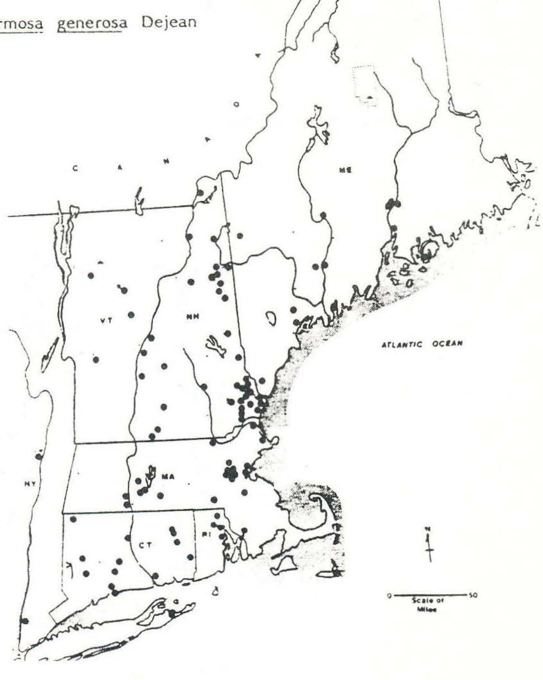

Figure 7. Distribution of Cicindela purpurea Olivier in New England.

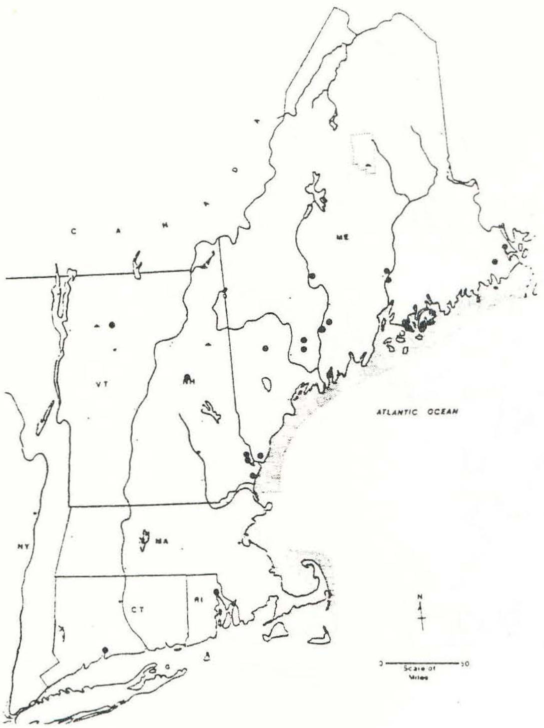

Figure 8. Distribution of Cicindela limbalis Klug in New England.

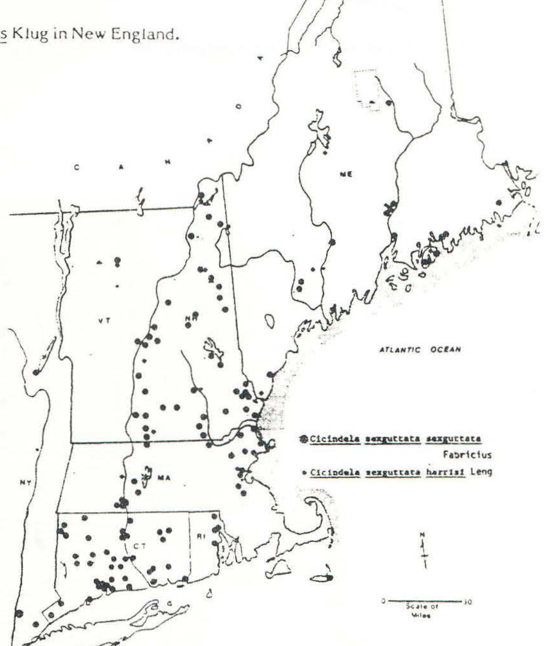
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Figure 9. Distribution of Cicindela sexguttata Fabricius in New England.

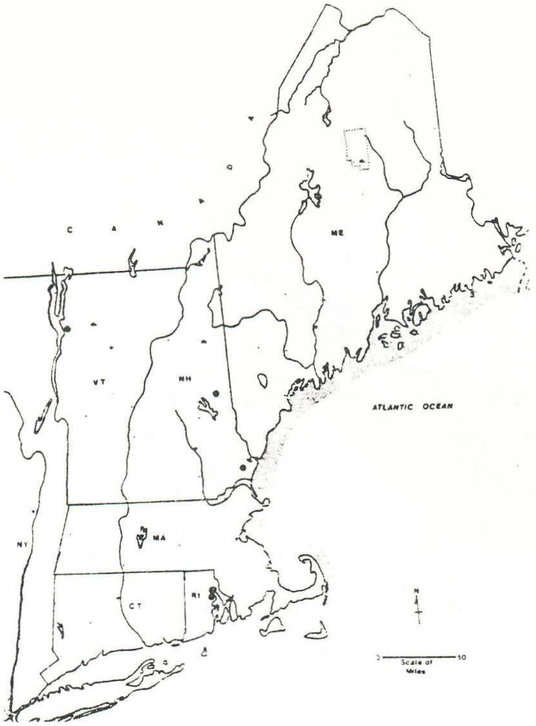

Figure 10. Distribution of Cicindela patruela Dejean in New England.

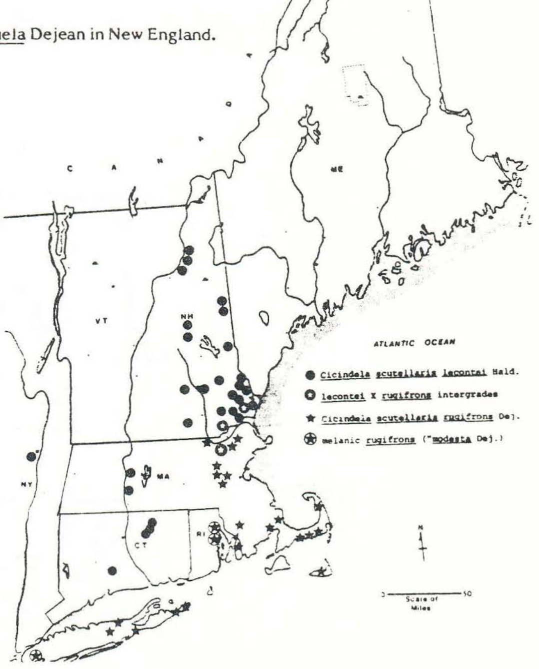
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Figure 11. Distribution of Cicindela scutellaris Say in New England.

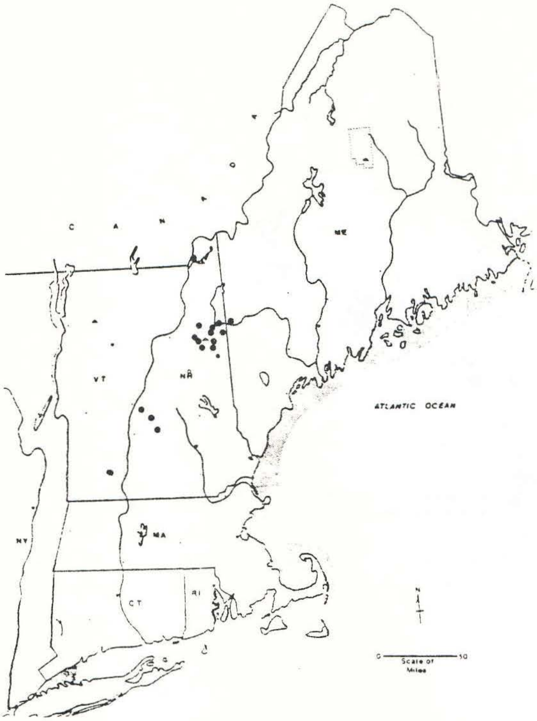

Figure 12. Distribution of Cicindela ancocisconensis T. W. Harris in New England.

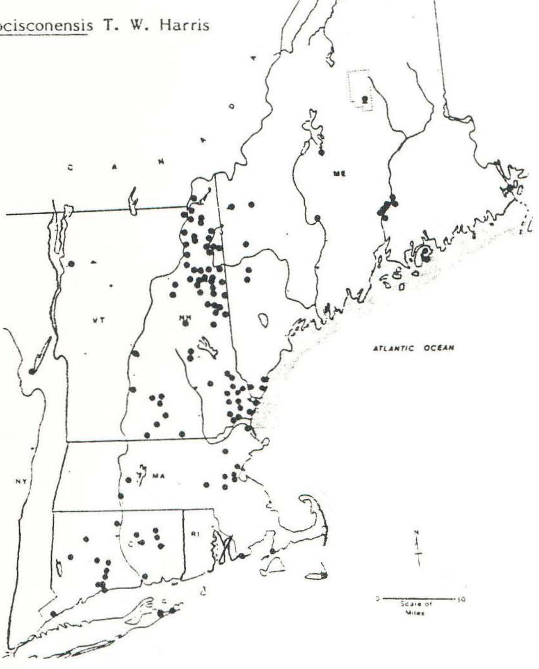

Figure 13. Distribution of Cicindela tranquebarica Herbst in New England.

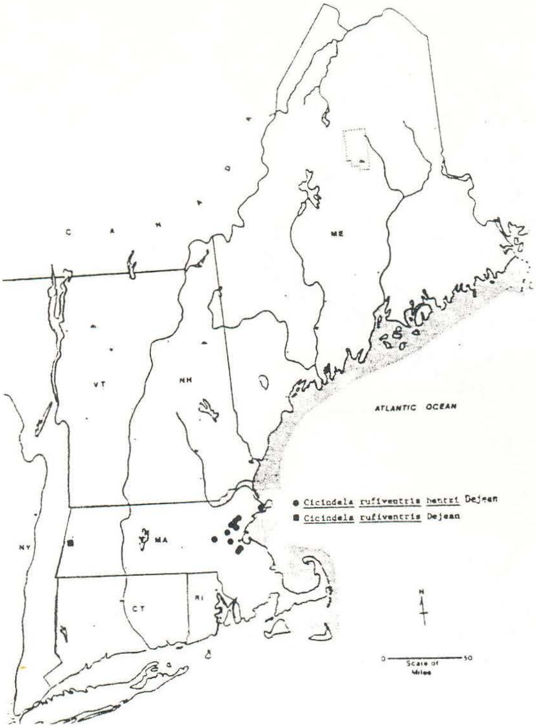
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Figure 14. Distribution of Cicindela rufiventris Dejean in New England.

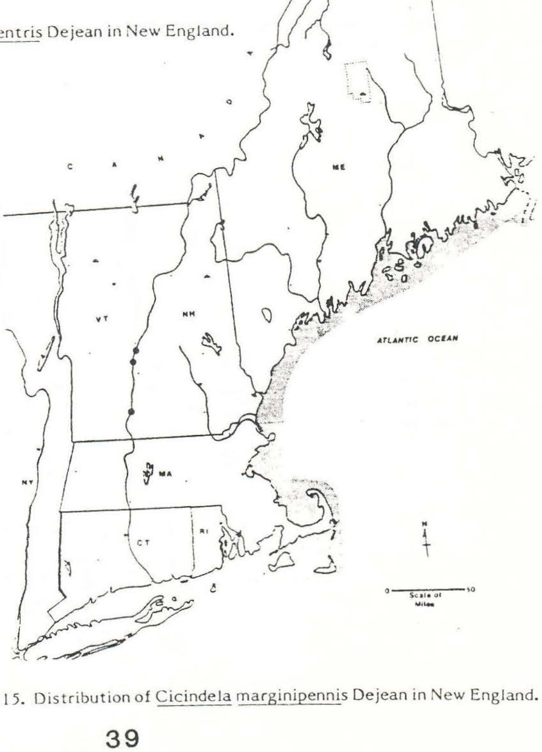

Figure 15. Distribution of Cicindela marginipennis Dejean in New England.

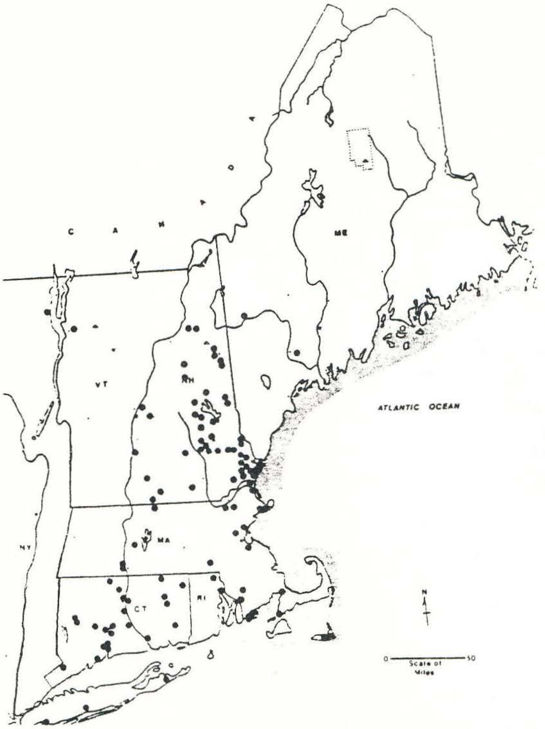

Figure 16. Distribution of Cicindela punctulata Olivier in New England.

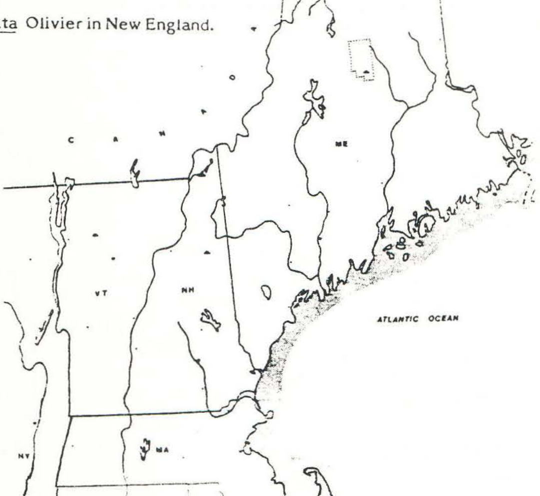

Figure 17. Distribution of Cicindela dorsalis Say in New England.

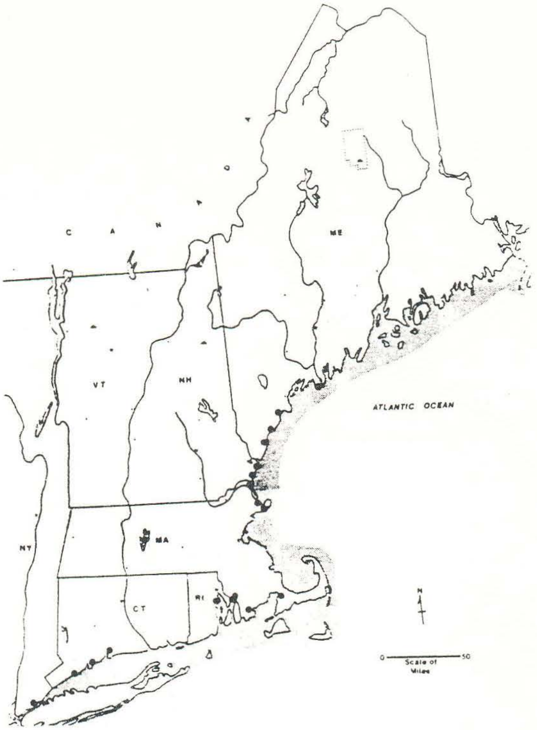

Figure 18. Distribution of Cicindela marginata Fabricius in New England.

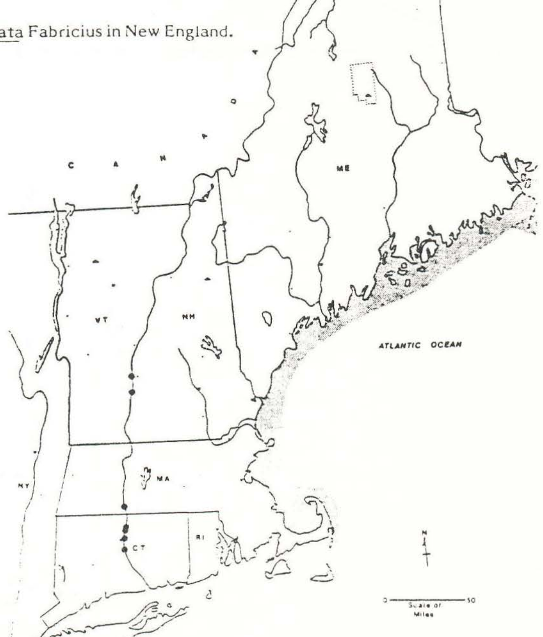

Figure 19. Distribution of Cicindela puritana G. Horn in New England.

A COLLECTOR'S CHALLENGE: DEVELOPING A FRAMEWORK FOR A HURON MOUNTAIN BEETLE FAUNA STUDY

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In 1984 I was approached by the Huron Mt. Wildlife Foundation to participate in an ongoing beetle fauna study in the Huron Mountains of Michigan's Upper Peninsula. My assignment would be to conduct a study of the ground beetle and tiger beetle (Carabidae) fauna of the region. This study would compliment other work, most notably an investigation of the Huron Mountain longhorned beetles (Cerambycidae) being conducted by Dr. David Gosling of White Pigeon, MI. In 1985 I began the first phase of my study.

I thought it would be useful to share some of the thinking that went into planning, executing and preparing results for this project. Many logistical problems had to be worked out in order to assure productive collecting. I always hope to achieve maximum utilization of my time in the field, and this study would be no exception.

The study would take place on property owned by the Huron Mountain Club (HMC). This HMC property totals 17,778 acres, of which 5400 acres of virgin forest included in a "nature reserve" in the heart of the Huron Mountains. The Huron Mountains are an isolated group of granite hills (900-1500' elevation) in the extreme northwest corner of Marquette Co., MI, adjacent to Lake Superior. No public roads penetrate the area. Access is gained by means of a few privately-owned gravel and sand roads and old logging roads.

Careful planning and pre-fieldwork study is an important, even critical, part of any research project. This faunal study is no exception. Preparedness is important in determining how successful any subsequent field work will be.

So, the first step was to visit the library to see what previous field work has been done in the area. As it turns out, there were two publications, one by A.H. Andrewes (in Cristy, 1929) presenting a list of insects collected in the Huron Mountains and another by Wells and Thompson (1976) on the flora (with a background on the geology of the region). This latter publication was especially helpful in identifying the major plant communities in the Huron Mountains and permitted selection of tentative study sites. Examination of topographic maps provided information on topography, accessibility, presence of streams, lakes and other natural features, and helped refine the selection of tentative study sites.

The next site was to select dates for conducting the fieldwork. Adults carabids are most prevalent in May, June and early July and again in August and September. For biological as well as personal scheduling, the first week in July was selected, with a second visit scheduled for the 2nd week in August.

About a week before travelling to the study area, I began assembling all of the collecting equipment, supplies and personal gear. The collecting equipment included pitfall traps, nets, vials, alcohol, aspirator, rake and shovel, headlamp, blacklight, and camera gear (habitat photos).

It takes 8 hours to drive from my home to the Huron Mountain Club, but at long last the time had some and I arrived at the study area. I spent what little of the first day was left settling into my quarters at the Huron Mountain Wildlife Foundation's Research Center at Ives Lake. (Fig. 1).

I spent my first full day exploring the HMC property. With map in hand, I proceeded to drive to all accessible areas, taking notes on habitats and prospective collecting sites. I wanted to gain a first hand knowledge of the entire property so I could make intelligent decisions on where to spend time in intensive field study and collecting. So, on the first day I spent my time scouting the area and did little or no collecting. I did, however, become quite familiar with the property and would now be able to study a good cross-section of existing beetle habitats.

Special habitat areas designated for intensive study included: (1) Lake Superior and inland lake beaches; (2) some logging roads and trails (Fig. 2); (3) streams; (4) marshes, bogs and beaver ponds (Fig. 3), and; (5) mountain tops. The remainder of the property was fairly uniform. The reserve area is mature maple and/or hemlock forest; the non-reserve areas, which have been selectively cut, are maple-birch-pine.

I now had to formulate a plan for sampling these habitats with maximum effectiveness, so as to obtain a reasonable cross-section of the carabid and cicindelid fauna of the region. The most important consideration was the management of time for optimal collecting success. I decided I should use the good weather (generally mid-morning to mid-afternoon) for direct collecting of specimens from their respective habitats (this consideration was particularly critical for the tiger beetles!). The early morning, later afternoon, and inclement weather periods would be used to check pitfall traps (Fig 4.), check beach drift and process collected specimens and field notes. Evenings, for obvious reasons would be used for blacklighting and headlamp collecting. In order that I might spend as much time in the field as possible, I decided to temporarily preserve all specimens in 70% ethyl alcohol and work them up after I returned home.

Here is specifically how I collected specimens from each of the habitat types: (1) Lake Superior and inland beaches -- examined beach drift for hidden beetles (in general early in the day was best); splashed water up on sand beach to cause beetles to emerge and run about; an aspirator was helpful for collecting the smaller specimens; (2) logging roads and trails -- these were driven (or hiked when impassable), with special attention paid to sandy spots where tiger beetles might occur; logs and stones rolled; (3) streams - the margins and banks were splashed with water to drive out the hidden beetles; soft mud & vegetation was treated (again an aspirator was handy), pitfall traps on banks; (4) marshes, bogs and beaver ponds - splashing and treading were employed. Also, a blacklight was run at night; (5) mountain tops -- access by foot only; hand collecting; checking plants and under stones; (6) forest areas - these were primarily sampled with barrier pitfall traps, although logs and stones were checked for hidden beetles. Fifteen barrier pitfall traps were run in July and 50 traps were run in August.

Unfortunately all good things must come to an end and it was soon time to return home. However, once all of the specimens are collected, the work has only just begun! The material must be pinned or pointed, labeled, sorted and ultimately identified. I do this type of work in the comfort of my collection room at home. Her I have the necessary books, papers and supplies to do the job.

As mentioned, the first step is to get the specimens pinned or pointed and then labeled. This can be a very time consuming task. I use my field notes and maps to formulate concise, but accurate specimen labels. I type a small number of each locality label (often leaving the date open so that it can be written in by hand) and then print them on card stock (reduced to 33% of their original size). I also have a supply of labels for collecting methods (baits, pitfalls, treading, blacklights) and habitats (lacustral beach, riparian beach, sand dunes, under logs, etc.).

The second step is to sort the unidentified specimens by tribes and/or genera; then I can do species determinations in a more organized and systematic manner. The species from this study were in great part identified using Lindroths "Carabidae of Canada and Alaska", with further assistance from recent literature and my 29,000 specimen reference collection. Occasionally, some specimens need to be sent off to other specialists for identification.

Records had to be kept of the identified specimens -- where they were caught, when and how many. This facilitates the penultimate step which is data analysis. Here we can look for new records (state and county), rare species, distribution trends, seasonal activity patterns, and much more. In my first season of study (14 days in the field, I collected 107 species in 33 genera (48 field sites) of which 93 species were not previously recorded from the Huron Mountains. I also produced 30 new county records and 2 new state records.

The initial step in this type of study is publication of the results. Any field work should be considered incomplete until this paperwork is done! It's important to share your results with other collectors and entomologists. Only in this way can we learn from one another.

As you can see, even the simplest of field investigations requires careful planning and management of time and resources. Once you master the skills of carrying on a small field study, you can easily graduate to more complex (even international) projects and provide a better understanding of the insect world.

Fig. 1. The "Stonehouse", located on Ives Lake in the Huron Mountains of Michigan's Upper Peninsula, serves as headquarters for researchers supported by the Huron Mountain Wildlife Foundation.

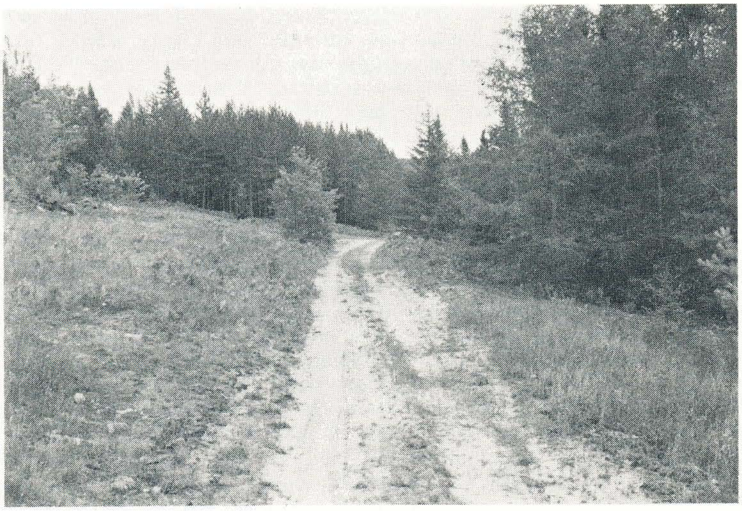

Fig. 2. Prospective tiger beetle habitat in a Huron Mountain boreal forest (and red pine plantation). Cicindela tranquebarica Herbst and C. longilabris Say were collected here.

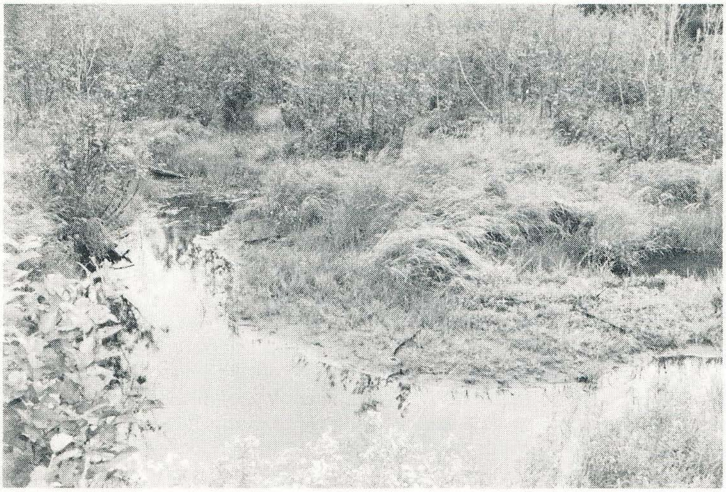

Fig. 3. Stream-side beetle habitat. Ground beetles in the genera Bembidion, Elaphrus, Chlaenius, Omophron, Agonum and Elaphrus were taken here in barrier pitfall traps on the sand shoreline of this small creek. Cicindela duodecimguttata Dejean was abundant here also, and a single cicindelid larvae (presumably of this same species) was taken in one of the traps).

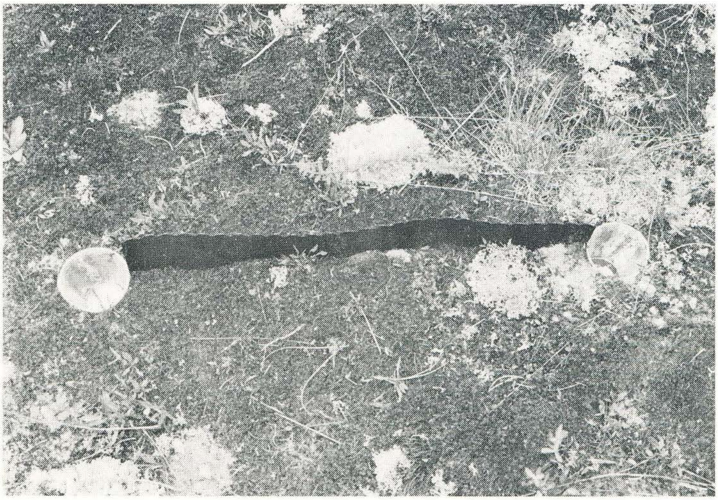

Fig 4. S. Simple barrier pitfall trap constructed of two 6 ounce drinking cups and a piece of black, molded plastic (used for garden edging). These traps are highly effective for capturing carabids, cicindelids, and many other terrestrial arthropods. The traps were checked daily, so no preservative was used in the traps.

FIELD NOTES

Collecting in New England

During the year of 1981 butterflies of every description were extremely abundant in my area. During the following years to date all but a few varieties all but disappeared. How long do these cycles last: 10, 15, 20 years? It would be worth noting when and if the butterflies return in the same numbers. During 1981 I was lucky enough to catch a "fairy yellow", Eurema daira (male) in Kent, Connecticut. This is the only one I have seen in my lifetime. It was a gravelly area near the Housatonic River, flying around some tall, white, weedy flowers. The specimen was in good condition except for being a little faded, like it had been out for about a week. I was wondering if this was a first for Connecticut?

Since butterflies have been so scarce around here I have been concentration on moths which seem to be plentiful at this time. A lights in Pittsfield, Berkshire Co., Massachusetts I caught an ello moth, Errinyis ello (female) on July 10, 1985. Only July 14th I caught Ascalapha adorata, the black witch. The ello was in good shape but not the "witch".

Sometimes I wish they could talk. I can only guess as to how they got here. I don't believe for one minute that they were strong enough to fly all the way from Florida, 1400 miles as the crow flies. I believe they hatched out no more than ten miles from here, even less. Maybe they got sucked up by a tornado and deposited over here by the winds.

I also collect Coleoptera. My favorite group is the Cerambycidae, the long-horned beetles. I have the book "Manual of Common Beetles of Eastern North America" (Dillon and Dillon, 1961) which I use to identify most, but I have at least a dozen specimens I cannot identify. I can't find a book on them.

My son and friend Joe Hess take at least two weeks vacation every year and go collecting bugs. We do real well. We add at least a dozen new species to our collections every year. We have a ball and can't wait for the next year to come around.

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Pittsfield, MA 01201
U.S.A.

BOOK REVIEWS

Insect Life. A Field Entomology Manual for the Amateur Naturalist. Ross H. Arnett, Jr. and Richard L. Jacques, Jr. Prentiss-Hall, Inc., Englewood Cliffs, NJ ISBN 0-13-467242-9 354 pp 9x7" paper, $14.95.

The cover of this book proclaims "Everything you need to know to identify, collect, preserve and understand insects...How to create an insect zoo and other exciting projects!" I think they deliver as advertised.

This has to be one of the most thorough entomology manuals available to the beginning entomologists and amateur naturalist. The book does not attempt to be the definitive treatise on each and every entomological topic; instead it presents the essential concepts and stimulates a curiosity to find out more.

Format: The softcover version measures 7 x 9 and 1/4 inches and has 354 pages. It is abundantly illustrated with line drawings, nicely done by Adelaide Murphy, and black and white photographs. The book is organized into a prefect, 18 chapters, 2 appendices, a glossary and an index. The 18 chapters present topics ranging from "World of Insects" to "Life Cycles" to "Insect Wars" to collecting techniques. One of the appendices lists entomological societies (incidentally the Young Entomologists' Society is listed!) and the other lists entomological literature (field guides, handbooks, and directories). The glossary is good and the index is functional.

There are two things I especially like about this manual. I like the emphasis it places on the role of insects as a part of the overall ecological system. This puts insects into perspective. Granted they are an important group, but they are not the only life forms on the planet Earth. Secondly, I like the diversity of topics; this book leaves no stone unturned, as it were. Topics range from biocontrol of weeds with insects to endangered insect species to habitat classification to insect communication to insects and art, and on.... The book also does an excellent job of presenting the usual topics such as collecting, preservation and rearing.

I think this book will be useful to both the novice and professional entomologist. The novice will like the straight-forward and organized layout, a writing style that flows smoothly, and the wealth of factual information and ideas. This book will make an excellent resource for 4-H entomology leaders and other group leaders and volunteers. I think the professional will like the diversity of topics and the thought-provoking subjects and statements.

Gary A. Dunn, M.S., R.P.E.
Extension Entomologist, USDA
and Y.E.S. Advisor

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My First Butterflies. Cecilia Fitzsimmons and Ray Marshall, Harper and Row Publishers Inc., New York, NY ISBN 0-06-021893-2 12pp (6 pop-up plates), 7 x 7" Hardcover, $8.95 Date of Publication: May 1, 1985.

Here is a delightful book for the youngest entomologist. It is both entertaining and informative.

The text is written by Cecilia Fitzsimmons. It features information of the butterflies of meadows and gardens, hedges and woodland, grasslands, and mountains. It also features travelling butterflies and an example of a butterfly notebook. The book features primarily North American species, but a few European species are included.

The paper engineering is designed by Ray Marshall. The book features butterflies that fly across the page or flex their wings in a variety of different ways. This "pop-up" feature makes the book interesting to children too young to read the text by themselves.

I highly recommend this book for the youngest aspiring Lepidopterists. Aside from the entertainment value, it also should serve to stimulate a genuine interest in studying butterflies. The grouping of butterflies by habitat helps to demonstrate elementary principles of butterfly habits, ecology, and behavior. Furthermore, the book ends with a butterfly notebook page which encourages the continued observation of these beautiful and interesting creatures.

Gary A. Dunn, M.S., R.P.E.
Department of Entomology
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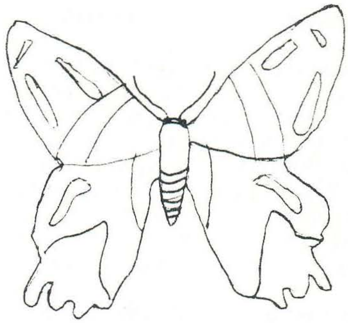


Nate Overland

TRADINGPOST

For Exchange: copies of papers of the Carabidae (Coleoptera), Ball and Nimmo 1983, Progaleritina; Kryzhanovskiy-Palaeartic Omophron; Allen, R. T. 1968, Morionini; Darlington, P. J. 1952, Bahama carabids; Erwin and Kavanaugh 1981, Bembidion; Bousqut, Y. 1983, Stomis; Goulet and Bousquet 1983, new Pterostichus; Moore, B. P. 1908, New Zealand Anillini; Casey, T. L. 1913, Memoirs on Coleoptera; Nagel, P. 1982, Cameroon Paussinae; Hayward 1908, Amara; Loveai, G. 1984, Hungarian maize field carabids; and Loreau, M. 1983, Abax ater alimentary region. Will trade for other literature or specimens of Carabidae and Cicindelidae. Send inquiries to: Gary A. Dunn, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 U.S.A. (2/4)

For Sale or Exchange: All orders of insects from Israel, especially Diptera and Hemiptera. Write for details. Izhak Nussbaum, Nahalat zvi 35, Petack-Tikva 49421, ISRAEL. (2/4)

For Sale: Many butterflies, beetles and other insects from all parts of the world. Write for main list and supplementary list every month. FOR EXCHANGE--same for many rarest insects and others. Send your offer. WANTED--all information regarding breeding of Goliathinae, Dynastinae and other Scarabaeidae. Also, we research living material like Dynastes hercules, neptunus, megasoma, Goliathus, etc. Gerald Pelissie, "Les Granges Noires, 01660 Chaveyrait, FRANCE. (2/4)

For Exchange: Small collection of North American Cocinellidae: 16 determined species, 8 misc. undet. species, 176 specimens in all. Will exchange for misc. Carabidae or Cicindelidae from anywhere but Michigan. Gary A. Dunn, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 U.S.A. (2/4)

Wanted: Correspondence with a resident of Japan who has an interest in both Lepidoptera and the Japanese cinema (mostly animated cartoons and monster movies) and who may be a source of merchandise from the movies (specified later) in trade for Lepidoptera or to buy. Send letters to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 U.S.A. (2/4)

Wanted: Anything having to do with the moth Argema mittrei, whether it is information, livestock, or papered specimens. Send all lists to David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 U.S.A. (2/4)

Wanted: Exchange of Coleoptera, especially Cerambycidae (worldwide). Many types of beetles available from different regions. Gontran Drouin, 50 Principale, Ste.-Henedine, Quebec, CANADA G05 2RO. (2/4)

Wanted: Ovae and pupae of the Lepidoptera, especially Saturniidae, Papilionidae, and Nymphalidae. Willing to buy. Send lists and prices to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 01835 U.S.A. (2/4)

Wanted: All books, new or used, pertaining to entomology, especially Lepidoptera, Coleoptera, Orthoptera, and general entomology. Send lists and prices to: David Albaugh, 9 Columbia Avenue, Jamestown, RI 02835 U.S.A. (2/4)

For Sale: Insect Pins Std. Black, Elephant, Stainless Steel, Minutens and Label Pins. Sizes 000 through 7 available. For complete list write: Ianni Butterfly Exterprises, P.O. Box 81171, Cleveland, OH 44181. U.S.A. (2/4)

For Sale: Worldwide collectible butterflies, beetles and rare insects, names with data. For subscription to butterfly and beetle price lists send $5.00 to Ianni Butterfly Enterprises. P.O. Box 81171, Cleveland, OH 44181 U.S.A. (2/4)

Wanted: Blow flies (Calliphoridae) on loan or for exchange from various regions of the U.S. (particularly the southwest), as part of a study of the distribution of these insects. All material sent will be identified and returned, except for a few specimens retained for the I.D. service. Blow flies are easily collected from raw fish or carrion baits. Send material to: Donald Baumgartner, 150 S. Walnut, Palatine, IL 60067 U.S.A. (2/4)

For Sale: Neotropical insects from northen Central America, or will **Exchange** same for Catocala (Lepidoptera: Noctuidae) especially from Europe, N. Africa, USSR, Central Asia, China or Korea. Also, SELL glassine envelopes in three convenient sizes; take fountain pen and stamp pad ink well. Edurdo C. Welling M., Apartado Postal 701, Merida, Yucatan, MEXICA (2/4)

For Sale: Worldwide Lepidoptera. Have a good selection of species from various parts of the Amazon region, South America, such as: Morpho, Papilio, Caligo, Agrias, Prepona, Heliconidae and many more. Top quality, papered with complete data. Good prices. Satisfaction guaranteed. Free price list sent on request. Thomas Greager, R.D. #6, Box 56-B, Greensburg, PA 15601 USA (2/2).

Exchange or Purchase: Cicidelidae and Carabidae worldwide. All letters answered. Gary A. Dunn, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 U.S.A. (2/4)

For Sale: Handbook of Insect Rearing, Volumes I and II edited by Pritnam Singh and R. F. Moore. This publication provides a practical guide for those who wish to rear insects for the first time. It is a do-it-yourself book, written in a simple logical style. 474 pp. US $77.75. Available from Elsevier Science Publishers, P.O. Box 1663, Grand Central Station, New York, NY 10163 U.S.A. (2/4)

For Sale: Elefant brand insect pins. Send SASE for prices. Thomas Greager, R. D. #6, Box 56-B, Greensburg, PA 15601 U.S.A. (2/4)

Wanted: Individual(s) interested in exchanging bulk beetle samples from blacklight traps. This could be easily run in the same fashion as the Y.E.S. Swap Box program. Write to Gary A. Dunn, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 U.S.A. (2/4)

Winter Catalog out Now! Even more material packed into our illustrated catalog of butterflies from South America, Africa, Far East, Europe. Top specialists in Morpho, Parnassius (request list). State interests please. Small orders always welcome. Send $1 cash/check for your Catalog by airmail, or $6 for our monthly catalogs and newsletters for one year. Transworld Butterfly Company (YES), Apartado 6951, San Jose, Costa Rica, C. America. (2/4)

Wanted: Livestock of the Buckeye, Junonia (Precis) coenia. Willing to trade or buy. Contact Kathy Miktuk, RD #1, Box 119, Panama, NY 14767 U.S.A. (2/4)

Exchange: Lepidoptera (worldwide), especially Nymphalidae and Pieride; also other families--Hesperiidae, Papilionidae, etc., and Coleoptera (worldwide), especially Cerambycidae and Scarabaeidae. All letters welcome and answered. Luis R. Perez, HC 02 Box 18881, San Sebastian, Puerto Rico 00755 U.S.A. (2/4)

Wanted: Cerambycidae from all over the world in exchange for specimens from Europe and the Soviet Union. Elvira Barchet, 6470 Clybourn Ave., #242, North Hollywood CA 91606. U.S.A. Telephone (213) 761-3764. (2/4)

For Sale or Exchange: Cocoons of A. luna, A. io lutheri, and C. promethea. SASE for prices. Will also accept desirable papered butterflies with data in exchange for cocoons. Larry J. Kopp, R. Box 30, Klingerstown, PA 17941. (2/4)

For Exchange: Will exchange many species of butterflies from Mayalasia, Phillipines, Taiwan, some from Africa, Peru, Brasil, and Europe, all in A1 quality, for A1 specimens from other countries (USA, Canada, Central America, South America, Australia, Indonesia, India, etc.). Exchange preferred, but can also buy. Please write to Patrick M. Malesieux, 87, rue Delhaye 59 148 Flines les Raches, FRANCE, (2/4)

To exchange or purchase: N.A., Neotropical Lepidoptera ova, pupae and cocoons. Offer in exchange fine exotic material. M. Zappalorti, Sr., 123 Androvette Street, Staten Island, NY 10309 U.S.A. (2/4)

Wanted: Worldwide Cicindelidae in trade for worldwide Lepidoptera. Willing to give several different or same species depending of type of Cicindelidae. All letters welcome. Contact: Ryan Bridge, 4329 Old Orchard Rd., York, PA 17402. U.S.A. (2/4)

Wanted: Information on how to receive Atticus atlas formosanus ovae, larvae, or pupae. Contact: Ryan Bridge, 4329 Old Orchard Rd., York, PA 17402. U.S.A. (2/4)

Wanted: Cicindelidae and Carabidae (Carabus, Cychrus, Scaphinotus, Calosoma, Anthinae only) species and literature. Worldwide beetles available of all families. Cesare Iacovone, Via G. Noventa #12, Scala I--int. 3, 00143, Roma, ITALY. (2/4)

Wanted: Live larvae of any tiger beetles and live true katydids, both female and male. Will pick up anywhere any pay for the catch and phone call. Glenn Firebaugh, 3636 Hoiles, Toledo, Ohio 43612. U.S.A. (419) 478-8312. (2/4)

For Sale: Large selection of papered Malaysia Butterflies, beetles, and other insects, all of A1 quality with date. Free catalog available from: Deco Enterprise, P.O. Box 155, TAIPING, Malaysia (2/4)

Help Available: To Y.E.S. members, ages 17 and up, collecting in the vicinity of Oviedo, Florida, northeast of Orlando. Housing, microscope, and library available with local Y.E.S. member. For more information, contact the Y.E.S. Trading Post. (2/4)

Wanted: Papered, A1 S. diana, royal walnut moth and Imperial moth (male and female of each). Send list. All letters answered. David C. Patten, General Delivery, Peacy Valley, MO 65788 U.S.A. Telephone: (417) 277-5836. (3/1)

Wanted: California Academy of Science Insect drawers, cabinets, or unit trays; determined insect specimens (any group); and journals, books and reprints from College of Idaho Museum of Natural History. Send materials to: William H. Clark, Assistant Director, Museum of Natural History, College of Idaho, Caldwell, ID 83605. ALL CONTRIBUTIONS ARE TAX DEDUCTIBLE! (2/4)

Wanted: Copy of the Butterfly Book by W. J. Holland. Most recent edition preferred, by not necessary. Will buy for a reasonable price. Kent Hudson, Box 85, Hinsboro, IL 61930 U.S.A. (2/4)

For Sale or Exchange: Many insect orders from the Southeast U.S., including cecropias, Dianas, stag beetles and cicada killers. Quantities very limited. Write for complete details. Bryan Belay, Rt. 1, Box 291, Pearisburg, VA 24134

Wanted: Information and advise on giant silk moth (cecropia, promethea, polyphemus and luna) mating behavior and male assemblages. Also, suggestions for a reference for identification of North American mantids and other Orhtoptera. Gary J. Lovell, 3818 Watson, Toledo, OH 43612 U.S.A (3/1)

Wanted: Deadstock (specimens) of any insect for life-cycle displays. Any size acceptable, but must be in reasonable condition; this includes cocoons, pupae, larvae, immature insects (prefer Lepidoptera, though). Willing to buy/trade. Ryan Bridge, 4329 Old Orchard Road., York, PA 17402 U.S.A. (3/1)

Exchange Wanted: Will exchange Cicindelidae and other insects from New York state and New England for any part of the U.S. or world. All letters will be answered. Michael A. Valenti, 135 Jamesville Ave., Syracuse, NY 13210 U.S.A. (3/1)

Wanted: Information on rearing Acherontia atropos, Deathshead Hawk moth (Sphingidae). Also interested in obtaining livestock of this species. Write to: Randy Robinette, 7302 Midland Trail Rd., Ashland, KY 44101 U.S.A. or Call: (606) 928-8441.

Free Publication: "A Planting Guide for Virginia Nectar-Seekers" by Patricia M. Purdy (a Y.E.S. member) and Jeffrey M. Curtis (Wildlife Education Coordinator for State of Virginia) and published by the Virginia Non-Game Wildlife Fund. This 18 page pamphlet is packed with information for attracting birds and butterflies. Send requests to: Young Entomologists' Society, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 U.S.A. (3/1)

Help Needed: A small library at a USDA sponsored research center in Saudi Arabia has notified Y.E.S. that they would be very appreciative of a donation of any entomology books or periodicals. They are in dire need of many out-of-print books (especially Coleoptorum Catalogue, 1910-1940, The Hague) on taxonomy, biology an the like. They would also be interested in corresponding with taxonomic entomologists who might be able to assist with various Saudi research projects. To make donations, or for further information, contact Dorothy Jessop, USDA/OICD, Room 4103 Auditors Bldg., Washington, DC 20250 (202) 475-4190. (Ed. Note: They are now receiving all Y.E.S. publications.) (4/1)

Wanted: Willing to identify, exchange or purchase buprestids on a worldwide basis. Please contact: Dr. Stanley Wellso, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115 U.S.A. (3/1)

Wanted: Citheronia regalis and Antheraea polyphemus, to buy. Send prices to Jerry L. Day, 1201 Withington, Medford, OR 97501 U.S.A. (3/1)

For Sale: Philippine insects--dried and papered specimens. Please contact Elizabeth Lumawig, P.O. Box 2684, Manila, PHILLIPPINES. (3/1)

For Sale or Exchange: Butterflies and moths, also some odd insects, I collected in New Zealand last winter. Also, Lepidoptera from North America, Europe and Japan, including several much-sought western species and subspecies. John Reichel, P.O. Box 789, Revelstoke, British Columbia, VOE 2SO, CANADA (3/1)

Collecting Safari: 17 days and 16 nights. Virgin rain forests, sea level to 7000 feet elevation. 800 kilometers by land, 300 by air. Day and night hunting (collecting) Honda generator. Accommodations at hotels and mountain resorts. Special rates to Y.E.S. members, and international air fare discounts. Your guide, host and companion, Lyle C. Armstrong, Ph.D. Write for information and itinerary. Space is limited. Darien Compound Safaris, Special Tours and Travel, P.O. Box 909, Panama 9A, REPUBLIC OF PANAMA (3/1)

For Sale: Sphingidae, Nymphalidae, Saturniidae, Helioconidae, ithomid sp., Caligos, and Morphidae. Also, Automeris, sp., Euchroma gigantea, Titanus gignateus, Harlequin, long horn beetles, Megasoma elephas, golden scarab and others. Darien Compound Safaris, P.O. Box 909, Panama 9A, REPUBLIC OF PANAMA. (3/1)

Wanted: Livestock of Saturniidae and Ceratocampidae. Send price list to: Jeff Miller, 550 Conifer Way, Ashland, OR 97520 U.S.A. (3/1)

For Sale: The rarest Rhopalocera from Reunion Island (near Madagascar). Quality A1, papered, named. **For Exchange:** Insects from Reunion, all of A1 quality, named with data. **Wanted:** Morpho, Papilio, Agrias preforia, Saturniidae, Danaidae, Ornithoptera, Troides, Dynastinae, Lucanidae, Goliathidae, Buprestidae, Phasmidae--top quality, papered and with complete data. ALSO, willing to offer information, publications, and identifications on insects of the madagascerene area. T. Claude Anderes, 18 Residence Caravelle, Blvd. de la Providence, 97400 St. Denis, Ile de la REUNION (FRANCE). (3/1)

Wanted: Correspondence with retired entomologists with background in tropical Lepidoptera and Hemiptera. Also, I am willing to share some native California Lepidoptera with young entomologists. Write to: Dr. Joe Vredenburgh, 6656 Trigo "B", Goleta, CA 93117 U.S.A. (3/1)

Collection for Sale: Large collection of South African Lepidoptera, also some Coleoptera, Diptera, Hymenoptera, and Homoptera. Butterflies: Danaidae, Acraeidae (41), Salyridae, Nymphalidae (60-includes separate spp.), Charaxes (100), Papilionidae (60 spec.), Pieridae, Libytheidae, Lycanaenidae, and Hespenidae; Moths: (represent almost all species in southern Africa) Swifts, Goats, Clearwings, Loopers, Hooktips, Silks, Emperors (100), Eggars, Monkeys, Hawks (120), Tigers, Tussocks, owls and many others. 220 specimens in other orders. Prefer to sell collection as a whole, but will consider selling all butterflies, all moths and all other orders as separate unites. Best offer. For information or bids, contact Mr. P.G. Woods, 8 Parker Gardens, Merritt Ave., Warner, Beach, 4125 REPUBLIC OF SOUTH AFRICA (3/10).

For Sale: Wild collected cocoons of H. cecropia. Please send a S.A.S.E. for a reply. James C. Romer, 7991 E. Hampden Circle, Denver, CO 80237 U.S.A. (3/1)

Wanted: Phasmida (stick and leaf insects). Livestock and deadstock. I specialize in this order, and in particular seek Timema species from California and other areas (eggs). I can purchase or exchange for Phasmida other orders. All letters answered. Paul D. Brock, "Papillon", 40 Thorndike Rd., Slough, SL 2 1 SR. ENGLAND. (3/1)

Wanted: Butterflies and Coleoptera, especially Scarabaeidae and Lucanidae, from Central and South America, especially Columbia, Peru, Bolivia, or Venezuela. I would prefer to buy, rather than trade. Send all lists/letters to Tetsuo Nawa, The Nawa Insect Museum, Gifu Park, 2-18 Ohmiya-cho, Gifu City, JAPAN (3/1)

Undergraduate Entomology Scholarship: In keeping with their interest in increasing public awareness and support for entomology, BioQuip Products, Inc. sponsors an annual $1,000 scholarship for a deserving undergraduate (college) student. Further information and applications (June 15 deadline) may be obtained by writing to Executive Director, Entomological Society of America, 4603 Calvert Road, College Park, MD 20740 (3/1)

PUZZLES &GAMES

Complete any of these and win a special prize! Send your puzzle completions by April 1, 1986 to: Young Entomologists Society, Department of Entomology, Michigan State University, East Lansing, MI 48824-1115, U.S.A.

Solve this cryptogram quotation by substituting one letter for another. Single letters, apostrophes, length and formation of words and punctuation are helpful hints. Good luck!

"G S V B L F M T V M G L N L O L T R H G H

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

H L X R V G B S Z H H L N V G S R M T U L I

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

V E V I B Y L W B!"

_ _ _ _ _ _ _ _ _

T Z I B Z. W F M M

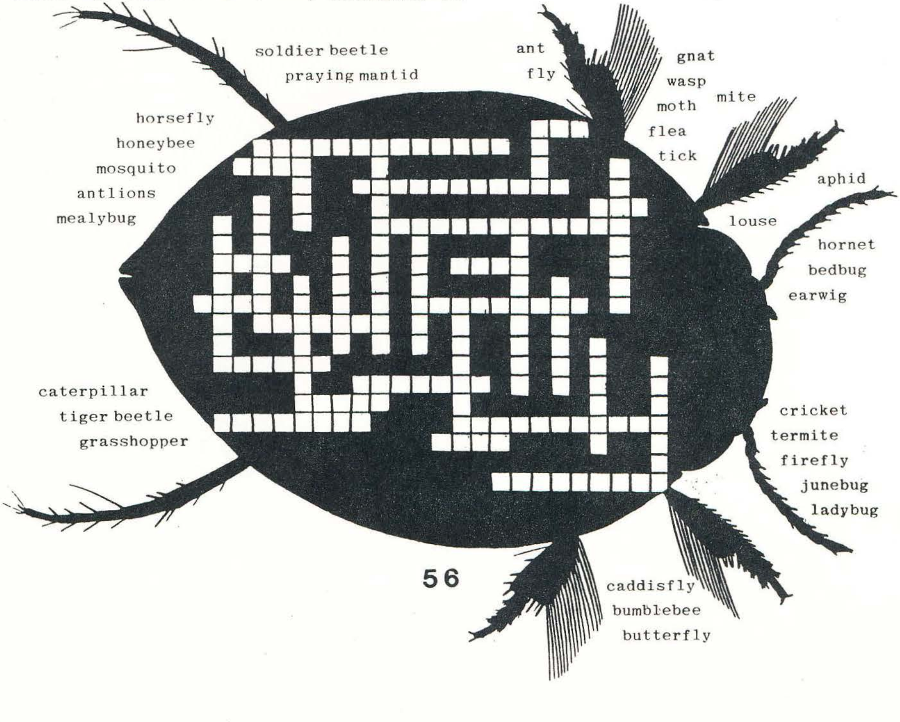
_ _ _ _ _ _ _ _ _

Puzzle by: T Z I B Z. W F M M

_ _ _ _ _ _ _ _ _

Place the 32 arthropod names in the proper spaces so that there are no empty boxes. Some words may share letters. Good luck!!

Puzzle by: Kristi L. Dunn, Haslett, MI

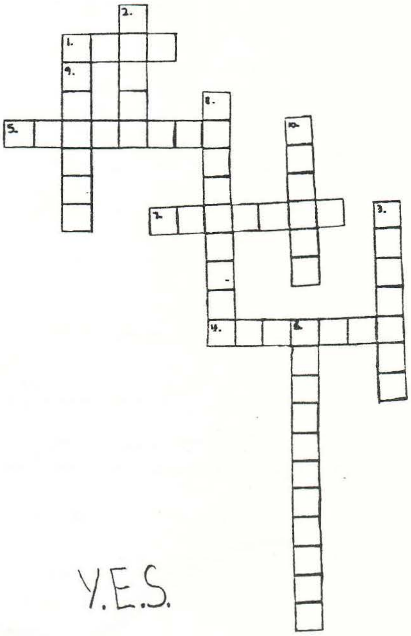


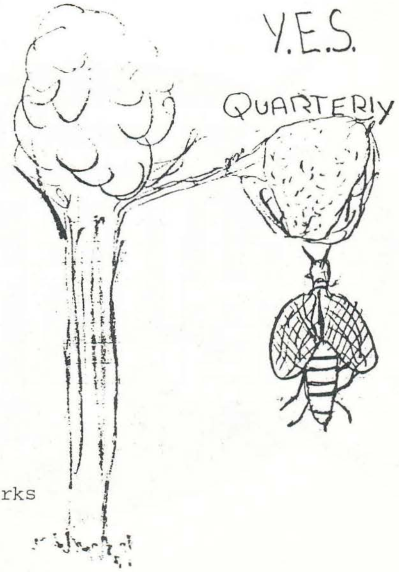
CROSSWORD PUZZLE

Chris Shen
317 Shiloh Dr.
Madison, WI 53705
U.S.A.

Across
1. the front part of the body that contains the brain
3. the insect order that means "toothed"
4. movable, segmented organs for sensation located on the head of an insect
5. breathing holes along each side of the abdomen of an insect
7. the insect order that means "two wings"

Down
2. the second stage in "complete metamorphosis"
6. the external covering of insects
8. the insect order that means "half wings"
9. the material that makes up an insect's external covering
10. the middle of the three divisions of the body of an insect





Greg Sparks

Insect Word Search

Find these words: silverfish, dragonfly, Orthoptera, Homoptera, sulfur, stinger, carpenterant, monarch, cecropia and wasp!

A	H	O	M	O	P	T	E	R	A	C	O	C
B	Z	N	T	E	X	C	I	R	C	A	N	A
U	S	I	L	V	E	R	F	I	S	H	M	R
C	U	W	K	L	M	N	C	P	X	Z	Y	P
E	L	W	A	S	P	T	R	E	L	M	X	E
C	F	J	H	S	R	L	A	N	P	X	L	N
R	U	A	V	U	T	S	P	P	N	T	U	T
O	R	T	H	O	P	T	E	R	A	O	E	E
P	L	D	R	A	G	O	N	F	L	Y	M	R
I	T	R	Z	E	G	H	B	E	O	C	A	A
A	M	D	F	J	S	T	I	N	G	E	R	N
U	L	M	O	N	A	R	C	H	Y	G	J	T

Puzzle by: Beccah Rothschild

Find these words: fly, junebug, wasp, insect, Thysanura, egg, moth, larva, bee and animal!

L	E	G	G	H	O	M	L	K	O
T	L	J	U	N	E	B	U	G	W
H	M	O	T	H	P	I	C	A	A
Y	O	R	E	I	Y	E	O	N	S
S	D	L	O	L	K	E	C	I	P
A	N	P	F	E	E	Q	K	M	D
N	A	P	Q	B	B	I	E	A	I
U	R	L	A	R	V	A	Q	L	P
R	I	N	S	E	C	T	A	B	T
A	Q	I	N	S	E	T	O	R	O

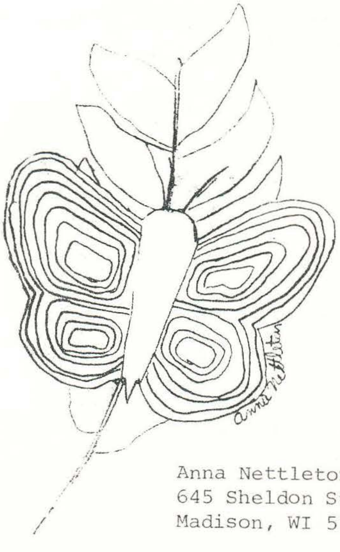
Puzzle by: Katie O'Connor

Insect Anatomy Word Search

Find these words related to insect anatomy: Head, thorax, abdomen, jointed legs, exoskeleton, chitin, compound eyes, ovipositor, spiracles, mouthparts and antenna!

A Q R B F K O E C C T E S A R K
E A O I O H X A R O H T Q T R A E
R S C S N E E S V M I I R R E N R
S I A N Y O J I I P T M P A Y O O
E W A E M D P O J O I C S P A N P
B T N S O O A E I U N H K H T E M
A N N Y S H S D K N I I A T E M E
N A E I E E L O A D T T L U Y O A
M C T N E X O S K E L E T O N D T
A O N T S D S T L Y H N D M Z B E
R U A E P S T A N E W O E L M A M
O A Y S I T H N O S A V L E E B Y
K E F A R H O E E O N I O T N G H
I B I S I E R D S E L C A R I P S

Puzzle by: Geoff Madding



Anna Nettleton
645 Sheldon Street
Madison, WI 53711